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Ontario

ROYAL COMMISSION OF INQUIRY INTO CERTAIN
DEATHS AT THE HOSPITAL FOR SICK CHILDREN AND
RELATED MATTERS.

Hearing held
8th floor
180 Dundas Street West
Toronto, Ontario

The Honourable Mr. Justice S.G.M. Grange

P.S.A. Lamek, Q.C.

E.A. Cronk

Thomas Millar

Commissioner

Counsel

Associate Counsel

Administrator

Transcript of evidence
for

October 18, 1983

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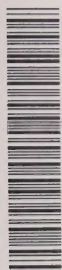
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ROYAL COMMISSION OF INQUIRY INTO CERTAIN
DEATHS AT THE HOSPITAL FOR SICK CHILDREN
AND RELATED MATTERS.

Hearing held on the 8th Floor,
180 Dundas Street West, Toronto,
Ontario, on Tuesday, the 18th
day of October, 1983.

- - - - -

THE HONOURABLE MR. JUSTICE S.G.M. GRANGE - Commissioner
THOMAS MILLAR - Administrator
MURRAY R. ELLIOT - Registrar

APPEARANCES:

P.S.A. LAMEK, Q.C.)	Commission Counsel
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D. HUNT)	Counsel for the Attorney-
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	of Ontario (Crown Attorneys
	and Coroner's Office)
I.J. ROLAND)	Counsel for The Hospital for
M. THOMSON)	Sick Children
R. BATTY)	
S. GRANT)	
D. YOUNG	Counsel for The Metropolitan
	Toronto Police
K. CHOWN	Counsel for numerous Doctors
	at The Hospital for Sick
	Children
F. KITELY	Counsel for the Registered
	Nurses' Association of Ontario
	and 35 Registered Nurses at
	The Hospital for Sick Children

(Cont'd)



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APPEARANCES: (Continued)

D. BROWN	Counsel for Susan Nelles - Nurse
G.R. STRATHY) E. FORSTER) P. DODDS)	Counsel for Phyllis Trayer -
J.A. OLAH) A. ARNOLD)	Counsel for Janet Brownless - R.N.A.
B. JACKMAN	Counsel for Mrs. M. Christie - R.N.A.
S. LABOW	Counsel for Mr. & Mrs. Gosselin, Mr. & Mrs. Gionas, Mr. & Mrs. Inwood, Mr. & Mrs. Turner, and Mr. & Mrs. Lutes (parents of deceased children)
F.J. SHANAHAN	Counsel for Mr. & Mrs. Dominic Lombardo (parents of deceased child Stephanie Lombardo); and Heather Dawson (mother of deceased child Amber Dawson)
W.W. TOBIAS	Counsel for Mr. & Mrs. Hines (parents of deceased child Jordan Hines)



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1 ---Upon commencing at 10:00 a.m.

2 THE COMMISSIONER: Before you may
3 start, Mr. Strathy, I have dictated something rambling
4 about the evidentiary problems and I am going to read
5 it. Mr. Lamek has copies of it and of course it will
6 appear in the transcript.

7 Mr. Sopinka has raised two questions.

- 8 (1) That no question should be put in
9 evidence intended to elicit an
10 answer indicating who committed an
11 alleged crime, and
12 (2) That the Police Report, that is the
13 report of the Metropolitan Toronto
14 Police referred to by the Attorney
15 General in his report to the legis-
16 lature, should be produced to him
17 and presumably to other Counsel
18 concerned.

17 As to (1), Mr. Sopinka concedes, as I
18 understand it, that such evidence may be relevant for
19 another purpose, namely to determine the cause of
20 death. He asks, however, that before it is
21 received some effort be made to explore how it can
22 be done without implicating an individual.

22 I am sympathetic to his position and,
23 particularly, am concerned about the unfairness it
24 may cause a party if the evidence is adduced at a
25



1
2 time when the opportunity to answer is to be long
3 delayed. Nevertheless, I cannot make a blanket
4 ruling for several reasons as follows:

5 (a) I cannot know in advance of the
6 evidence being tendered whether
7 the evidence will be relevant to
8 Phase I. Each instance must be
9 considered at the time it is
tendered.

10 (b) The problem is not yet resolved as
11 to whether the Terms of Reference
12 which require me to report on the
13 cause of death permit me to express
14 any opinion as to the complicity of
15 any person in the deaths. As will
16 be seen, I am suggesting that there
be argument upon that question.

17 (c) It is abundantly clear to me that
18 the apparent complicity of Susan
19 Nelles, at least up till the time
20 of her release after the Prelimin-
21 ary Inquiry, is relevant to the
22 determination of the issues in
Phase II.

23 To prevent an injustice, not in the
24 Commission but in the reporting of the proceedings
25 in the media, I will certainly entertain any motion
for immediate cross-examination or for evidence out



1 of turn or for any other relief whenever a party's
2 complicity is implied. I hope that will not be
3 necessary but an example has already been demonstrated
4 during the evidence of Dr. Fowler.

5 The second issue relating to the Police
6 Report clearly is arguable. As the Counsel most
7 concerned are Mr. Sopinka and Mr. Percival, I suggest
8 that they agree upon some time, preferably at 3:45
9 in the afternoon and the argument can then take place.
10 Of course it is open to Counsel to resolve the matter
without argument.

11 There are two further matters which
12 are not so urgent but I am satisfied must be resolved
13 in the interests of a fair hearing. They are first
14 the issue referred to above, namely whether I can in
15 the Report if I should find that there was a deliber-
16 ate overdose of Digoxin contributing to the deaths of
17 any baby implicate any person in that overdose, or
18 to put it in Mr. Scott's words, If I can "name names".
19 Secondly, some Counsel have suggested that evidence
20 in Phase II should not include anything that occurred
21 after the release of Susan Nelles at the Preliminary
22 Inquiry. I think the problems lend themselves to
23 written argument and I would ask any Counsel having
24 an opinion on either matter to submit that written
25 argument to me by November 1st, 1983. That argument
will be distributed among all Counsel on that day and
each Counsel will have an opportunity to reply by



1 November 10th. I remind all Counsel that the
2 essential question is what the Terms of Reference
3 permit or require.

4 There is just one other matter I wish
5 to raise at this time. Mr. Sopinka suggests that
6 no finding of misconduct can be made against any
7 person unless a formal notice of misconduct is given
8 and presumably all the evidence given thereafter. I
9 do not so interpret the section which calls only for
10 reasonable notice of the substance of the misconduct
11 alleged against him and full opportunity to be heard
12 in person or by Counsel. I cannot imagine that there
13 could ever have been the slightest doubt as to why
14 each member of the Trayner team is here represented
15 by Counsel funded by the Province. If such a doubt
16 has ever existed, let me make it now quite clear
17 that each of them may be found to be implicated either
18 by accident or with deliberation in the deaths of
19 the children. I emphasize that to date very little
20 of such evidence has been presented but it is
21 anticipated that some evidence will be tendered and
22 of course Counsel for the parties concerned will be
23 entitled during the hearing to be heard and to adduce
24 evidence relevant to the issues before this
25 Commission.

I suggest, ladies and gentlemen, it is



1
2 probably wise to read the matter over before you make
3 any comments on it. I will entertain comments any
4 time anyone wants, but failing that the two matters
5 are for Mr. Percival and Mr. Sopinka to make arrange-
6 ments for the time for arguing; and the other one is
7 anyone who has any comments on the two questions I
8 raised to submit written argument by the 1st of
9 November.

10 Yes, Mr. Strathy?

11 MR. STRATHY: Just before I resume
12 my cross-examination, Mr. Commissioner. I understand
13 what you have said about not making any submissions
14 on your comments until we have had an opportunity to
15 reflect on it.

16 THE COMMISSIONER: Yes.

17 MR. STRATHY: I would like to make
18 submissions.

19 THE COMMISSIONER: Yes, all right.

20 MR. STRATHY: But not necessarily at
21 this stage.

22 THE COMMISSIONER: No, fine.

23 MR. STRATHY: I had understood when
24 Mr. Sopinka made his submissions the last day it was
25 simply a proposal to you which he wanted to argue at
a later date.



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THE COMMISSIONER: Yes.

MR. STRATHY: And I withheld my comments at that time because I understood there would be an argument at a later date and I think Mr. Sopinka refrained from making his full pitch to you for the same reason.

THE COMMISSIONER: As I understood it it was whether it was worthwhile taking the time even to argue the matter. I have now indicated that I am not prepared to give a ruling with respect to that, but each time it comes up the question can be raised, there is no problem it can be raised if it comes up, but it hasn't come up since. I am not going to hear argument on that question now because in my view it would be impossible to deal with it.

MR. STRATHY: Well I think, Mr. Commissioner, there may be a need for argument on other questions, including the question of notice and including the question of your Terms of Reference.

THE COMMISSIONER: Well, that is what I am suggesting there be written argument on that. I suggest there be oral argument on the police report, and I am suggesting that if you want to put it that my mind is closed to the matter there is no point in



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2 having argument on the first question.

3 MR. STRATHY: The first question being?

4 THE COMMISSIONER: The first question
5 being the question as to whether or not, as I put
6 it here:

7 "That no question should be put in
8 evidence intended to elicit an answer
9 indicating who committed an alleged
10 crime,..."

11 And I have said that I am sympathetic to the position
12 and I declined to make a blanket order.

13 MR. STRATHY: I wonder if you might
14 extend your area of written submissions to the question
15 of notice. Because I would support Mr. Sopinka's
16 position on this issue, and that there has to be
17 specific notice and the blanket notice is not ---

18 THE COMMISSIONER: Well, certainly I
19 suppose we could have that. What I really was doing
20 was that you can raise that as a motion at any time
21 you like and you can certainly submit written argument
22 on it if you want to. I am telling you now that I
23 do not intend to have this Commission go through the
24 evidence all over again as Mr. Sopinka was suggesting,
25 that is if we have to give notice at some time of
some particular complicity and then go through all the



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3 evidence again, I don't intend to do that.

4 MR. STRATHY: I think Mr. Sopinka
5 would have wanted to have an opportunity to present
6 argument to you on that very point.

7 THE COMMISSIONER: Well, I thought
8 he did, and I told him I didn't accept that.

9 MR. STRATHY: It was my impression
10 that he started to refer to some of the authorities.

11 THE COMMISSIONER: Mr. Sopinka can
12 appear at any time and put his position and you can
13 put your position at any time. I have indicated a
14 pretty firm view on the matter to you. Your client,
15 Mr. Sopinka's clients, and several other clients have
16 been I think on notice since the beginning of this
17 Hearing on what the problem is that they are facing.
18 If I haven't made it clear in this I don't see how
19 I could possibly make it clearer. So reasonable
20 notice, it doesn't say written notice, it says
21 reasonable notice of what misconduct might be found
22 against them and an opportunity to reply to it.

23 MR. STRATHY: I might say with
24 respect I don't agree that is notice within the
25 meaning of the Statute and I think that is the
position Mr. Sopinka is taking.

THE COMMISSIONER: Well ---



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3 MR. STRATHY: But I understand what
you have said.

4 THE COMMISSIONER: Yes.

5 MR. STRATHY: The only other point
6 I want to raise, Mr. Commissioner ---

7 THE COMMISSIONER: I may out of an
8 abundance of caution give another notice, I don't
9 say I won't, but I may after, but that notice will
10 not be a notice intending to permit the whole to
11 proceed again. If that is what the legislators
12 meant they need their heads bent, because you can't
run a Commission that way.

13 MR. STRATHY: I may get into the
14 issue as to what the legislators meant in the
15 Statute.

16 THE COMMISSIONER: Yes.

17 MR. STRATHY: The only other point,
18 sir, Mr. Sopinka asked for the Police Report. Now
19 as I understand it the Police Report is something
20 that-the brief that the police prepared to assist
the Crown Attorneys ---

21 THE COMMISSIONER: No.

22 MR. STRATHY: --- and that Mr. Sopinka
or his predecessor...

23 THE COMMISSIONER: I have seen that.
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3 No, I think the Police Report that we are talking
4 about is the Police Report that the Attorney General
5 read, that the Attorney General made reference to in
6 his statement, isn't that the one we are referring to?

7 MR. YOUNG: That is correct,
8 Mr. Commissioner.

9 THE COMMISSIONER: That is the one
10 you have in mind is it not?

11 MR. YOUNG: It is the report that was
12 prepared for the Chief of Police.

13 THE COMMISSIONER: Yes.

14 MR. STRATHY: May I ask when it was
15 prepared?

16 THE COMMISSIONER: It was prepared
17 at any rate before the Attorney General made his state-
18 ment which would have been at the end of April of
19 this year. Do you know the date of it?

20 MR. LAMEK: It is dated February, 1983.

21 THE COMMISSIONER: February of 1983,
22 that is the Police Report upon which the Attorney
23 General acted.

24 MR. STRATHY: All I say is this. Until
25 we have seen the document we really don't know what
it does and does not include and there may be other
things that would be required to be argued.



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3 THE COMMISSIONER: But that is all
4 he asked for, if you want to ask for something else
5 afterwards you can always ask for that.

6 MR. STRATHY: I just wanted to make
7 that clear.

8 THE COMMISSIONER: Yes. You probably
9 have discovered by now that almost, practically none
10 of my rulings are carved in stone but I thought it
11 would be a good idea to tell you about these so that
12 you would understand what was happening. If someone
13 wants to ask a question that they imply some complicity
14 of some particular person, some crime, it has to be
15 objected to at that time either as to relevance or
16 as to some other relief that is wanted, because that
17 is the way I am going to act.

18 As far as the Police Report is concerned
19 it will not be released to anybody until the argument
20 has been heard and I have made a ruling. As far as
21 the other two matters are concerned they obviously
22 will not be decided until after November the 10th
23 when all the argument is in. So far as the notice
24 question is concerned I have made my statement and
25 I may decide with an abundance of caution I will
give another notice to certain persons and I may not.

MR. STRATHY: Thank you.

THE COMMISSIONER: All right.



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All right. Now, do you want to proceed?

MR. ROLAND: Mr. Commissioner, before my friend proceeds. I wasn't here yesterday but I gathered at the end of the day there was some excitement as a result of Dr. Soldin's disclosure of ongoing experiments that he was having.

THE COMMISSIONER: Yes.

MR. ROLAND: And just to make it clear to all the participants and to you, Mr. Commissioner, Miss Cronk and I met with Dr. Soldin a week ago last Friday in which she interviewed him to prepare her examination of Dr. Soldin, which was done by her yesterday and, in the course of that, there was mention of these experiments that were ongoing.

Dr. Soldin indicated to Miss Cronk and to me that he would prefer not to get into those experiments at this stage because they were ongoing and that he hadn't arrived at any conclusions from them at that stage or any definitive conclusions and I understand since then of course he has made some additional discoveries. Experiments are moving along at a rapid pace now but they are still ongoing and Dr. Soldin is reluctant to get into the details of them.



B.2

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2 He has given you, I understand,
3 yesterday, I have reviewed the transcript, a summary
4 of what he has been doing and some of his earlier
5 and tentative conclusions but the experiments continue
6 and are continuing throughout this week. He indicates
7 to me that the next two or three weeks may be very
8 exciting weeks for him in terms of this experiment.

9 I want it to be made clear in fairness
10 to Commission counsel and I think to the Hospital
11 that we intended, I think Commission counsel intended
12 and certainly the Hospital intended to put all of
13 that material before you when the experiments reached
14 a more definitive conclusion than they have to date.

15 THE COMMISSIONER: Yes. Well, I can
16 well understand your reason for saying this but there
17 is not much we can do about it now.

18 MR. ROLAND: No, there isn't.

19 THE COMMISSIONER: Mr. Strathy has
20 raised the issue.

21 MR. ROLAND: Yes, he has.

22 THE COMMISSIONER: And if he wants to
23 pursue it I can't tell him he can't.

24 MR. ROLAND: No, that's true. That's
25 true. I have no objection to Mr. Strathy pursuing it
but I didn't want the sense to be left that anybody



B.3

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2 was holding back on this material in this Commission,
3 Commission counsel or the Hospital, but that we under-
4 stood from Dr. Soldin, at least ten or twelve days
5 ago, that he would prefer to leave his evidence on
6 this series of experiments until he had reached a
7 more definitive conclusion.

8 THE COMMISSIONER: Unless somebody will
9 guarantee that he will come back, and I hope nobody
10 will guarantee me that because there is nothing I
11 like better - I guess the only thing I like better in
12 seeing a witness come up to the stand is to see him
13 leave in the hope that he will never come back at all,
14 so, I don't know.

15 MR. ROLAND: With great respect,
16 Mr. Commissioner, I would have thought you would be
17 very anxious to know when a series of experiments
18 are concluded, what the results are.

19 THE COMMISSIONER: Well, there is no
20 question that I would like to have that. If he has
21 nothing to say, if it develops that he does his
22 experiments and he can give us no more I don't want
23 to see him.

24 MR. ROLAND: I understand that. If
25 the experiments turn out to be faulty in some way in
which he has conducted them or inconclusive and so on,



B.4

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2 and can't assist the work of this Commission, then
3 obviously he wouldn't come back. He is in the course
4 of conducting those experiments now. He has some
5 early and tentative conclusions and he has given those
6 to Mr. Strathy yesterday I understand.

7 I quite agree, Mr. Strathy can continue
8 to pursue that line if he so chooses today. What I
9 want to indicate to you is that those will continue,
10 those experiments will continue and be ongoing and
11 if they arrive at some conclusions that may assist
12 this Commission's work, then we or the Commission
13 counsel I presume will call him back so that he can
14 give you the benefit of those conclusions.

15 MR. HUNT: If I could just make a
16 comment, Mr. Commissioner.

17 THE COMMISSIONER: Yes.

18 MR. HUNT: I don't know if you intend
19 to restrict any of the cross-examination but I
20 appreciate my friend wasn't here yesterday for the
21 dramatic announcements by the witness himself at the
22 end of the day but I didn't get the impression from
23 anything the witness said that we were into a research
24 situation or an experimental situation here.

25 He indicated to us at page 1368 that
he had developed an assay for the measurement of



B.5

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2 digoxin by liquid chromatography as well as mass
3 spectrometry and definitively, and that was his word,
4 not anyone else's.

5 THE COMMISSIONER: Yes, isolated to
6 Substance X.

7 MR. HUNT: So that this compound is
8 digoxin and cannot be anything else. Those were his
9 words.

10 THE COMMISSIONER: Oh, yes.

11 MR. HUNT: The witness then went on
12 to ask for samples back from either the police or the
13 Centre of Forensic Sciences and, quite frankly, I was
14 certainly under the impression as of the end of
15 yesterday that this was not a research project that
16 the witness was asking us to participate in with him
17 but before he would make comments like that he was to
18 the point in his work where he could make some
19 scientific statement about it.

20 Now, that having been opened by the
21 witness, I think there may be a need to explore that
22 with him before he leaves today. I appreciate my
23 friend may not have been aware of quite precisely the
24 import of the witness' comments yesterday, but that
25 certainly is my understanding of the situation.

MR. ROLAND: I don't quarrel with what



B.6

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2 Mr. Hunt has to say. I think there are two issues
3 here: one is the analysis of some tissue to determine
4 if indeed digoxin is or is not in those particular
5 tissues being analyzed and, as I understand it, and
6 having looked at the transcript yesterday and spoken
7 to Dr. Soldin, that he is able to do that. That is
8 now what I was talking about. I was talking about
9 the issue of an endogenous substance, Substance X or
10 Y or Z or whatever it is in all of us, and the
11 circumstances in which it may find its way into body
12 serum or urine and so on. That is a different issue
13 and that is the experimental part of his studies.

14 THE COMMISSIONER: Yes, all right.

15 Miss Cronk?

16 MS. CRONK: Yes, Mr. Commissioner. If
17 it assists you, I share a certain of Mr. Hunt's
18 submissions to you. It was certainly my understanding
19 on the basis of the evidence that the witness gave
20 yesterday that he had put forward the nature of the
21 studies that were being conducted and the results at
22 a level that I had not understood was yet prepared
23 to advance the matter and because of the way the
24 evidence went in on that aspect yesterday it is
25 certainly my intention to explore the issue with the
witness further in re-examination if my friends do not,



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particularly in light of what I understood him to say at our pre-evidence meeting that Mr. Roland has referred to.

THE COMMISSIONER: Yes. Well, I am not going to restrict anybody's cross-examination and I don't think we can count on the return of Dr. Soldin. It may well be that he will return with all sorts of interesting information but I think you have to act upon the assumption that he will not.

All right, Mr. Strathy.

MR. STRATHY: Well, I just would like to put my two cents in before I start to cross-examine.

I would say to you, Mr. Commissioner, that I have a concern that this sort of evidence that we have gone into yesterday in my cross-examination has to come out through me and it doesn't come out through Commission counsel.

THE COMMISSIONER: That's what Mr. Roland and ---

MS. CRONK: Now, just a minute.

MR. STRATHY: I would like to finish my submission.

THE COMMISSIONER: Yes, all right.

MR. STRATHY: It is very interesting that research is going on and I am sure it is



B.8

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2 fascinating to the Hospital and the university and
3 to the witness but obviously this is a public exercise
4 and it is important that the evidence be presented
5 when it is available and it concerns me that
6 Commission counsel have knowledge of this sort of
7 research going on and that it is not brought out.

8 Now, they are the people that have
9 control over the evidence and in normal circumstances
10 one might well say, well, all right, we won't deal
11 with it because it is a research project but surely
12 in a public inquiry it is important that this be
brought out.

13 THE COMMISSIONER: No. I think that
14 the matter was put before you that the witness himself
15 said, this is what I understood from Mr. Roland, the
16 witness himself said that he was not yet in a position
17 to give any evidence and would prefer not to and for
18 that reason it wasn't pressed. And then he volunteered,
19 almost volunteered when you were cross-examining, so,
20 clearly he had either thought better of it, changed
21 his mind or something but he had something that he
22 wanted to say.

23 I don't know really, I don't see any
24 fault on the part of anybody. If the witness says
25 I am doing some work on something, I am not in a



B.9

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position to give any evidence on it, I would prefer
not to do it, it is not unreasonable not to press him.

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MR. STRATHY: Well, that might be so
in other circumstances but surely the very fact that
he is doing the research is relevant to the Commission.
Surely the fact that the Hospital thinks there may be
an explanation for all this may be relevant.

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MS. CRONK: Mr. Commissioner, I must
rise to this. Whether or not my friend intended, I
take great offence at the suggestion that has been
made. As Mr. Roland suggested, and I will take it
one step further, it was my very clear understanding
on the basis of the meeting that I held with Dr. Soldin
before he came back to testify that not only was he
not in a position to testify with respect to these
results but he himself was not prepared to attest
at this stage as to the validity and were he
subsequently in a position to do so we would then have
adduced that evidence.

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THE COMMISSIONER: Yes, all right.

MS. CRONK: And I made that specifically
clear to Mr. Strathy yesterday afternoon.

THE COMMISSIONER: Yes, all right.

Now, Mr. Roland, you want to make a statement?

MR. ROLAND: Yes. I think I was at



B.10

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that meeting as well and I am not as hot about it as
Miss Cronk is ---

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MS. CRONK: And I'm getting hotter.

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MR. ROLAND: Basically what she said
is accurate that the witness indicated to us that he
wasn't prepared at this stage or at that stage to
talk about it because it was still ongoing and he
would prefer to leave it to a later stage.

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To be fair to the witness as well it
is ongoing and the experiment is at the last ten days
and indeed this week are at critical points and
information is coming in at a great pace. It is at
that stage of the experiment.

13

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THE COMMISSIONER: Yes, all right.

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MR. ROLAND: So, when the witness said
to us ten days ago he wasn't prepared to testify
on the information he had then, to be fair to the
witness I think he has had some additional information
since then and he will continue to acquire more
information over the next few weeks.

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THE COMMISSIONER: All right. Now

I think we have had all the statements we want to have.

Do you want to get on with the cross-examination? You are not limited in any way, and I would like you to put most of the rest of your comments to the witness, but if you have one more thing you want to say, please don't say it in a way that will require or will automatically knee jerk reaction from Mr. Roland or Miss Cronk, that is all.

MR. STRATHY: Well, Mr. Roland is a very honourable gentleman and Miss Cronk is a very honourable lady, and I don't want to suggest there is anything improper in what they did. That should leave them seated for a little while.

But it does seem to me that we should have Dr. Soldin back at some time after this research has been completed.

THE COMMISSIONER: Well, we will see about that, and you can always apply, if he doesn't turn up at somebody's auspices, you can apply for a subpoena.

MR. STRATHY: Mr. Roland has indicated to me that the Hospital will call the



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1
2 doctor if there is anything further that comes to
3 light in the course of his research.

4 May I ask that the doctor resume
5 the stand then?

6 THE COMMISSIONER: Yes. All right.
7 Thank you.

8 STEVEN JOHN SOLDIN, Resumed

9 THE COMMISSIONER: Yes, Mr. Strathy.

10 CROSS-EXAMINATION BY MR. STRATHY (Continued):

11 Q. Doctor, towards the end
12 of the day yesterday you made a request that samples
13 be produced for you so that you could perform an
14 analysis, and I want to be sure, please, what that
15 analysis was that you intended to do.

16 Now can you assist us, please,
17 as to what methodology you intended to apply?

18 A. Well, I would like to add
19 a cautious note first of all: The analysis that
20 we would attempt to apply to materials, were they
21 available, would involve high performance liquid
22 chromatography, extensive high performance liquid
23 chromatographic separations; not just a single
24 analysis by HPLC, and would involve mass spectrometry
25 of column eluents which are found to have
digoxin activity.



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Q. So that you would use the
HPLC to separate the elements and then apply gas
spectrometry -- mass spectrometry.

A. Mass spectrometry or gas
chromatography, mass spectrometry, yes. Either MS
or GCMS to the purified preparation that has digoxin-
like activity.

Q. So it would be a combina-
tion of the two processes then?

A. Correct.

Q. That would enable you to
determine whether the substance is digoxin or some-
thing other than digoxin?

A. Hopefully that would be
the case, yes. Now what the actual concentrations
of let us say digoxin or Substance X are in either
the tissues or the body fluids that might be
provided may or may not enable this study to be
performed with an appropriate conclusion being
reached.

Q. All right. That is
something we will have to find out in due course
obviously.

A. Yes.

Q. Doctor, are you familiar



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with the methodology adopted by Mr. Cimbura in his analysis of various tissue samples from the bodies of some of the children we are dealing with?

A. Well, I was here for his evidence. Now that doesn't mean that I am familiar with all his techniques.

Q. Well, let me put it to you -- sorry. My understanding is that he used a combination of high pressure liquid chromatography and radioimmunoassay. Is that your understanding?

A. Yes.

Q. And as I gather what you are suggesting is that you would go considerably further than that?

A. Well --

Q. Because you would have mass spectrometry?

A. I would add mass spectrometry, yes, and we would do extensive high performance liquid chromatographic runs.

Q. More than just the one Mr. Cimbura did?

A. I don't know how many he did. I can tell you we do many.

Q. When you say "many", how



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many are you talking about?

A. Five or so.

Q. On the basis of your understanding of Mr. Cimbura's methodology do you have concerns as to whether or not you would be able to isolate the digoxin from other substances using his methodology?

A. If you are asking whether I have concerns whether he can separate digoxin from Substance X using HPLC and radioimmunoassay, yes, I have some concerns about that.

Q. And is that why you are not only doing several HPLC runs but also applying mass spectrometry?

A. Yes, that is correct.

Q. Is it fair to say that your methodology is a more refined methodology?

A. Well, mass spectrometry as I said yesterday is a definitive procedure. It identified compounds. So it would be able to identify digoxin. It would be able to identify Substance X. It would be able to distinguish between the two.

Q. And it is your view that if you are able to apply these tests to specific



C6

1
2 samples or some of the specific samples taken from
3 the bodies of children who died during this period,
4 you will be able to tell whether the readings are
5 readings of digoxin or readings of something else?

6 A. Provided sufficient
7 material is given to our group I think that may
8 be possible, yes. May be possible, and I am
9 cautious about it.

10 It depends on the actual concen-
11 trations of either digoxin or Substance X in these
12 materials.

13 If we get sufficient material,
14 one should be able to definitively establish whether
15 or not it is digoxin or Substance X.

16 Q. Do you know from what you
17 found out between last night and this morning whether
18 that material is available or not?

19 A. No, I have no idea.

20 MR. YOUNG: If my friend wishes me
21 to interrupt him, I have made some enquiries of
22 officers, Mr. Commissioner, and if there are any
23 samples, they would be with the Centre for Forensic
24 Sciences. They are not with the police. We do not
25 have any.

MR. HUNT: Yes, an inventory is



C7 1
2 being made today of what samples are still at the
3 Centre and what condition they would be kept in,
4 what solution --

5 THE COMMISSIONER: What happened
6 to the exhibits at the preliminary inquiry? Were
7 any of these made exhibits?

8 MR. HUNT: I may stand corrected,
9 but anything that had to be kept in a preservative
10 or refrigerated is at the Centre as I understand.

11 MR. YOUNG: I am informed, Mr.
12 Commissioner, that no actual samples were made
13 exhibits at the preliminary.

14 THE COMMISSIONER: Well, presumably
15 then they still would be with the Centre if they are
16 there.

17 MR. HUNT: Oh, there is material
18 there.

19 THE COMMISSIONER: Yes.

20 MR. HUNT: As I say, I can't
21 tell you what it is because I am told it will take
22 a day to inventory it all and that will be done
23 today.

24 THE COMMISSIONER: Yes.

25 MR. HUNT: So the information
should be available tomorrow.



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THE COMMISSIONER: Yes. All right.

3

MR. STRATHY: Q. Doctor, turning

4

to another subject you mentioned in your evidence

5

yesterday you had in your experience found levels

6

of in excess of 50 nanograms per millilitre of

7

digoxin in I think it was serum where contamination

8

had occurred. Contamination I take it of the

9

sample.

10

Do you recall your evidence in

that regard?

11

A. We found high digoxin

12

concentrations in certain samples that had been

13

contaminated. I don't know if I mentioned greater

14

than 50. Maybe you could refer me to the page there?

15

Q. I have it in my notes.

16

I don't have the page reference, doctor, but that

17

was my recollection that you mentioned the figure

18

of greater than 50 in your examination by Miss

Cronk.

19

A. Well, we have had high

value --

20

MR. LAMEK: At page 1313.

21

MR. STRATHY: I beg your pardon?

22

MR. LAMEK: Page 1313, sir, line 3.

23

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MR. STRATHY: Thank you. Yes, thank you, Mr. Lamek.

Q. You mentioned in the context, Doctor, of referring to different ways that you could get elevated levels, and you mentioned one is the possibility of timing as the sample being taken fairly soon after administration. Then you said:

"We have had experience of concentrations over 50 when there was contamination of the sample.

We have had concentrations over 50 when there was contamination of the sample."

My first question is when were those experiences of contamination?

A. They have happened at various times since I took over the digoxin procedure.

Q. This is in the context of therapeutic monitoring program?

A. Correct, yes.

Q. And my recollection that was July of 1981?

A. Something like that, yes. Now we have had high concentrations, I am not happy with saying that they definitively are over 50 in



1
2 number. We have had some high concentrations, some-
3 where between I think 20 and 50.

4 Q. All right. My next question
5 is how have those contaminations occurred?

6 A. Well, I guess there are several
7 routes and possibilities. One would be if digoxin
8 was given in a syringe, and then that same syringe
9 is used to draw a blood sample, that syringe would
10 have a lot of digoxin still sticking to the walls of
11 the syringe and you get a very high measurement.

12 Another is if digoxin is given in
13 a particular site with an ingrainning line, we have
14 an ingrainning line in a lot of these patients,
15 digoxin might be administered and then the serum
16 sample, or a blood sample could be drawn shortly
17 thereafter for measurement of a number of things,
18 including digoxin and you could get contamination
19 from that factor.

20 Obviously whenever we obtained a very
21 high result of this type it was immediately repeated
22 on a stat basis on that patient. It is not a
23 frequent occurrence but it has happened maybe three
24 times since July of 1981.

25 Q. All those being circumstances
though of contamination in living patients?



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A. Yes, the patients have never shown any clinical signs of digoxin toxicity.

4

5

Q. And the patients were all alive at the time the samples were taken?

6

7

A. They were all alive medically, yes, to my knowledge.

8

9

10

Q. Doctor, you mentioned that, I believe it was in connection with the Miller child, that you requested a specimen of the digoxin elixir so you could submit it to analysis?

11

A. Yes.

12

Q. Was that request from you?

13

A. Yes, I think, I believe it was.

14

15

Q. To whom?

16

A. To the doctors that were on that ward, I think it was Dr. Costigan.

17

18

Q. And when you say on that ward, do you mean 4A/4B?

19

A. 4A/B, yes.

20

Q. And did you yourself see the specimen that was obtained?

21

22

A. Subsequently, yes, it came in after the analysis had been carried out and subsequently I saw whatever preparation had been obtained.

23

24

25



1
2 Q. Was it your understanding it
3 was digoxin paediatric elixir?

4 A. Yes.

5 Q. Do you know, was it a full
6 bottle?

4
7 A. I can't recall how full, but
8 I think it was fairly full.

9 Q. Do you know how much was taken
10 out of the bottle in order to test it?

11 A. To do the dilution?

12 Q. Yes.

13 A. I must have directed the
14 technologist, I can't recall if I told her to dilute
15 one ml 10,000 times, or if I told her to dilute 100
16 microlitres 10,000 times, I would have given her the
17 guidelines.

18 Q. Is it only one bottle to your
19 recollection?

20 A. Yes, at that time it was only
21 one. I am not sure if I mentioned yesterday we did
22 measure another bottle some time before that, did I
23 mention that?

24 Q. I am sorry.

25 A. On the Wednesday before Allana
Miller passed away, or on the Thursday, we measured



1
2 another preparation of digoxin from that ward.

3 Q. And what were the circumstances
4 of measuring that sample?

5 A. Well, the circumstances as I
6 recall it this was the first knowledge that I think
7 I had of any possible problem with digoxin in the
8 hospital, and Dr. Hill had a meeting with - he called
9 me into his office and said there was some problems
10 with digoxin, possibly with the medication and that
11 he thought we should check out some of the medication
12 on Ward 4A/4B which is what - I then went and got a
13 bottle of it and gave it to Dr. Ellis who was running
14 the dig. assays at that time and he measured digoxin
15 in that particular sample and I think that was on
16 the Thursday that the measurements were made.

17 Q. Do you recall where you got
18 that bottle from on the Thursday?

19 A. From Ward 4A/B, yes.

20 Q. Was it a full bottle?

21 A. It was I think a pretty full
22 bottle, yes.

23 Q. Really my question is was it
24 a bottle that had been in use, or was it a fresh
25 bottle from the shelf?

A. I don't believe it was a fresh



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bottle, it was a bottle that had been in use.

3

Q. But your recollection is it

4

was relatively full?

5

A. Correct.

6

Q. Just one last area, Doctor.

7

There have been some statements this morning - we
opened making comments about your research, and perhaps

8

we should find out from you what exactly it is that

9

is going to be taking place in these exciting weeks

6

10

to come. What is it that you have in mind to do?

11

I guess one of the things you are going to do if you

12

can get these samples from Mr. Cimbura's refrigerator
is to apply your test to the samples?

13

A. Well, that would be one of

14

them, yes.

15

Q. I don't want you to give

16

away any secrets for your publications, but can you

17

give us for the assistance of the Commission some

18

indication where you are going?

19

THE COMMISSIONER: I am far more
interested in this Commission rather than in his
publication.

21

MR. STRATHY: That is what I say.

22

THE COMMISSIONER: What do you intend

23

to do?

24

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2 THE WITNESS: We are continuing to
3 isolate substance X from water loading experiments;
4 we are continuing to purify it using the techniques
5 I have described; we obviously wish to identify this
6 material.

7 THE COMMISSIONER: Well, there were
8 two things as I understood it yesterday. The first
9 one was the isolation of digoxin with substance X,
10 so you can isolate substance X and you can also
11 determine whether some substance really is digoxin
12 or not. The other aspect I found interesting was
13 where you talked about the production of digoxin
14 in the body, that is in the urine you spoke about
15 the production of digoxin.

16 THE WITNESS: Well substance X --

17 THE COMMISSIONER: Substance X or
18 something that registers.

19 THE WITNESS: Right.

20 THE COMMISSIONER: Are you continuing
21 with that experiment?

22 THE WITNESS: Yes, those experiments
23 are continuing.

24 MR. STRATHY: Q. Are you continuing
25 to investigate, Doctor, will you be continuing to
investigate the effect of these various resuscitation



1
2 efforts on the possible generation of substance X?

3 A. Certainly.

4 Q. Thank you. Is there anything
5 else you would like to add?

6 A. I think that is as far as I
7 would like to go now, there are other things.

8 THE COMMISSIONER: You have been
9 through that before.

10 MR. STRATHY: Given what my friend Mr.
11 Roland said I am content to leave it at this point.

12 THE COMMISSIONER: Thank you. Mr.
13 Hunt.

14 CROSS-EXAMINATION BY MR. HUNT:

15 Q. Doctor, I would like to go
16 back to your evidence yesterday with respect to the
17 death of Allana Miller. You indicated to Miss Cronk
18 that you got a phone call from Dr. Costigan at about
19 2 or 3 o'clock in the morning and at that time he
20 asked you if you would do an analysis on a sample of
21 blood. I take it from your evidence you were not sure
22 at that time whether Allana Miller was dead or not?

23 A. I can't recall. He might have
24 told me she had died, I can't recall if he told me
25 that or whether he mentioned she had an arrest.

Q. According to the chart she



Soldin, cr.ex.
(Hunt)

1
2 died, she was pronounced dead at 3:27 a.m., does
3 that assist you at all?

4 A. As much as it assists you,
5 yes.

6 Q. Is that unusual that you would
7 get a call that time of the night?

8 A. Yes, very unusual.

9 Q. I take it you were asleep?

10 A. Yes.

11 Q. And you had to wake up and
12 answer the call?

13 A. Yes.

14 Q. Did you make any notes of the
15 call at that time?

16 A. No, I don't think I did; written
17 notes you mean?

18 Q. Yes.

19 A. No.

20 Q. So when was the next time you
21 heard something about it?

22 A. Well, it must have been somewhat
23 later when the sample had been obtained. Now, I can't
24 recall what time that was, these events occurred many
25 years ago as you know, but some time in the morning.

Q. After you got up?



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A. Yes.

3

Q. I'm just going to read you

4

a little bit of the evidence of Dr. Costigan about
this, all right?

5

A. Sure.

6

7

MR. HUNT: Mr. Commissioner, this is
Volume 45, beginning at page 70, about line 20, and
this is during direct examination by Mr. Lamek.

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"Q. Now, can we move forward, move
on to an event later on in that week.

11

We know that in the early hours of

12

Saturday morning, March the 21st,

13

a baby called Allana Miller died on

14

Ward 4A. I don't believe, Doctor, that
you had anything to do with the care

15

and management of that child, am I

16

right?

17

A. Yes.

18

Q. A Code 25 was called. Were you
involved in the unsuccessful

19

resuscitation attempt on that child?

20

A. No.

21

Q. All right. When did you learn
of her death?

22

23

A. It was approximately maybe

24

7:30 on that Saturday morning, the

25



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"21st.

3

Q. Were you on duty that day?

4

A. No, no.

5

Q. Were you at the hospital when you found out about Allana Miller's death?

6

7

A. Yes. I had just dropped in my wife. She was working that day, she's a nurse in the Hospital.

8

9

10

Q. Your wife is a nurse at the Hospital?

11

12

A. Yes.

13

Q. Working the day shift that day?

14

A. Yes.

15

Q. So, you had driven her to the Hospital?

16

A. And I had gone up to do some work myself.

17

18

Q. All right. You had arrived then, what, about 7 in the morning?

19

20

A. Yes. She had to start at 7:30, so, it was about 7, 7:15.

21

22

Q. All right. And was it shortly after your arrival that you learned of the death of Allana Miller?

23

24

25



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"A. Yes, I phoned Dr. Canny.

3

Q. Who is he, please?

4

A. Sorry, Dr. Canny is the
Associate Chief Resident who was on
call that night.

5

6

Q. Yes. The preceding night?

7

A. Yes, the preceding night.

8

9

Q. And was it from him that you
learned of the death of Baby Miller?

10

A. Yes."

12

11

Now, sir, from that it would appear
that Dr. Costigan first learned about the death of
Allana Miller at 7:30 in the morning. Would you
agree with me it sounds that way?

12

13

14

A. Yes.

15

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Q. Then we have Dr. Carver's
evidence, and I am referring to Volume 35 at page
6829, Mr. Commissioner, where he has just finished
talking about a meeting that was held at the
Coroner's office on the Saturday afternoon, that is
the afternoon of the 21st:

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"Q. I understand you did not learn
of the death of Allana Miller until
you returned to the Hospital after the
meeting of March 21st?



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"A. That is correct. I went from that meeting to the Hospital and then Dr. Costigan met me in my office and told me that another child, Allana Miller, had died on the ward, that digoxin level had been drawn but because of the weekend there was going to be a delay in determining this.

I requested that special procedures be instituted so that that digoxin level be developed as quickly as possible. I think I specifically asked him to call Dr. Soldin and stated that we needed this right away."

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Do you agree with me it would appear that Dr. Carver's recollection is he told Dr. Costigan to give you a call sometime Saturday afternoon?

A. That's what it sounds like.

Q. Well, would you agree with me then there is no way Dr. Costigan was calling you at two or three in the morning on Saturday morning to tell you anything about Allana Miller?

A. From what you've read me his recollection is different from mine.

Q. All right. So, there is no doubt in your mind at all that two or three in the morning on Friday you got a call from Dr. Costigan -- I'm sorry, Saturday morning, two or three in the morning on Saturday morning you got a call from Dr. Costigan?

A. Well, I thought it was Dr. Costigan. Maybe I am in error but I thought it was.

Q. All right. Well then, let us see what you are in no doubt about. You are in no doubt you got a call at two or three in the morning?



Soldin
cr.ex. (Hunt)

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A. Yes.

3

Q. No question about that

4

at all?

5

A. No question about that.

6

Q. So, if it wasn't Dr.

7

Costigan there was some other doctor who called you
at two or three in the morning on Saturday morning
to ask you whether you could do a digoxin level on
the blood of Allana Miller?

10

A. Right.

11

Q. All right. We don't know

12

who that doctor is but it is a doctor that obviously
had something to do with Allana Miller and was
concerned about digoxin and concerned about her
blood level, the blood level of digoxin?

15

A. Yes.

16

Q. That was two or three

17

in the morning on Saturday morning?

18

A. Yes.

19

Q. All right.

20

THE COMMISSIONER: I take it this
could not have been Cook on Sunday morning?

21

THE WITNESS: No. No, I recollect

22

I had two phone calls in the early hours in the

23

morning. One was on Cook and one was on Allana

24

25



Soldin
cr.ex. (Hunt)

E3

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2 Miller.

3 MR. HUNT: Q. Now, yesterday
4 as well, sir, you told us about your analysis of
5 some IV fluid. I believe this was with respect to
6 the case of Justin Cook?

7 A. Yes.

8 Q. You gave the results of
9 your analysis of the fluid and you indicated that
10 the results as far as you were concerned, page 1334,
11 ruled out the possibility that digoxin had been
12 administered in the IV fluid. Would you like me to
13 read you the question and answer?

14 A. Right.

15 Q. I'm looking at page --

16 A. No, I understand, you
17 don't have to read it.

18 Q. Oh, do you, all right.
19 So, your testing of that fluid, as far as you were
20 concerned, ruled out the administration, or the
21 possible administration of digoxin by the IV fluid?

22 A. In that bag, yes.

23 Q. And you qualified that
24 by going on to say that it was your understanding
25 that the IV fluid that you tested was from the bag?

A. Right.



1
E4 2 Q. All right. And you
3 agreed that, if we are talking about the line we
4 are into a different thing altogether?
5 A. Yes.
6 Q. All right. Now, are you
7 familiar at all with an IV fluid setup? It has the
8 bag on a little stand.
9 A. Somewhat, yes.
10 Q. And usually the bag, the
11 fluid from the bag drips into a little bottle affair
12 at the top I think called a buretrol.
13 A. Yes.
14 Q. And then it goes down
15 into the line and there is a little valve. There is
16 a gap between the top of the bag and the fluid that
17 is in the buretrol where it drips in, is that right?
18 A. Yes.
19 Q. An down the line there
20 are a number of entries on the line called ports.
21 If one was to be of a mind to put something in an
22 IV bag, I take it one has to take the bag down off
23 the little stand that it is on and remove this
24 connection from the top of it, that is where the
25 line joins the bag and then put whatever it is into
the bag and reinsert the connection at the top and



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put the bag back up on the little rack. Would that be a fair understanding of how one would put something into the bag?

A. I think one could just inject it into the bag if one wanted to.

Q. Right through the side of the bag?

A. Right through the side.

Q. In which case you might not have a leak all over the place I guess?

A. You might not.

Q. All right. Another way of injecting something by means of the IV fluid would then be to just take a syringe and put it in one of the little ports?

A. Right.

Q. And just squirt it in?

A. Yes.

Q. And the ports run down the line all the way down to somewhere close to where it enters the patient?

A. Yes.

Q. I take it as between the two procedures if somebody was of a mind to give a patient something and they wanted to do it quickly,



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the easiest thing to do, the fastest thing to do
would be to just inject your syringe into the little
port and squirt the liquid in?

A. Yes.

Q. Because otherwise you
are into this messy situation of having to take the
bag down and put it in there?

A. Yes.

Q. So, really, the fact
that you reject the possibility of the digoxin being
administered by means of the fluid in the bag, that
is only half the question as far as we are concerned,
I appreciate that?

A. Certainly, yes.

Q. And it may be in terms of
trying to decide whether or not digoxin was
administered by the IV fluid we have to look at the
other route which is through the line itself?

A. Yes.

Q. And it may well be that
if somebody was of a mind to do it that is perhaps
the best route to do it, or at least the better of
the routes to do it. Would you agree with that?

A. Yes.

Q. Now, if I could deal for a



1
E7 2 moment with your research, sir, in the Substance X.
3 You indicated, I think, that this began about five
4 months ago.

5 A. I became quite heavily
6 involved in this project about five months ago.

7 Q. When would that be, in May?

8 A. In May, yes.

9 Q. So, that was after this
Commission was called?

10 A. After this Commission was
11 called, yes.

12 Q. Which was in April.

13 A. Before I had appeared in
it.

14 Q. Oh, yes, the Commission
15 didn't start hearings until late June.

16 A. Yes.

17 Q. So, do I take it from that
18 that the project had something to do with the
calling of the Commission?

19 A. I don't think there is
20 any connection whatsoever.

21 THE COMMISSIONER: It's the other
22 way around, surely.

23 MR. HUNT: I beg your pardon?
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THE COMMISSIONER: It is the other way around, surely. The Commission had something to do with the research.

MR. HUNT: Well, I think that is what I meant.

THE COMMISSIONER: Oh, I see, all right.

MR. HUNT: Let me try it a different way, Mr. Commissioner.

Q. Did the calling of this Commission in April in any way have anything to do with your involvement in the research project beginning in May?

A. I don't think there was any connection, no. Not in my mind anyway.

Q. Not in your mind?

A. Maybe in yours but not in mine.

Q. Well, I am just trying to see whether there was because you see I have an open mind at this point. When was the idea to conduct this research project, when did it come to somebody first?

A. I think that is a very difficult question to answer. We have had anomalies



E9 1
2 with digoxin measurement at the Hospital that I have
3 been aware of for quite a long time, way before this.
4 These anomalies obviously needed some research to
5 sort them out. We were measuring digoxin in certain
6 neonates. We were finding digoxin concentrations in
7 neonates that were not receiving digoxin and this
needed sorting out.

8 So, what compounds were causing
9 these problems needed to be addressed and, you know,
10 these ideas formulated over time.

11 Q. All right. Well, I think
12 maybe --

13 A. So, I can't tell you
14 exactly when, you know, on Tuesday morning, April 1,
15 1980 I had this brainwave, that didn't happen.

16 Q. Was it your idea to
start the research project and get it rolling?

17 A. Well, Dr. Goldberg, who
18 is our Biochemist in Chief, in discussions I had with
19 him, he indicated that he thought this was an area
20 of great interest and that we could well do some
21 research in this area in the Biochemistry Department
as such.

22 Q. All right.

23 A. We should look at that.

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So, he was very supportive of work in this particular area.

Q. There is nothing sinister about my question with respect to the timing of it, but certainly nobody is going to suggest there was anything wrong with starting it after the Commission had been called. But it would appear that these matters that are the subject of your research didn't become sufficiently important to actually undertake the research into them until the Commission had been called.

MR. ROLAND: That's a conclusion my friend draws. If my friend wants to know how it began, why doesn't he just ask the doctor.

THE COMMISSIONER: I thought he did.

MR. HUNT: I did, about ten questions ago.

MR. ROLAND: He keeps suggesting things, like did this Commission have some influence or they weren't sufficiently important before this time. If you would just put the question.

THE COMMISSIONER: Well, I think he did though.

MR. ROLAND: If he just would put the question how it came about, he would answer it.



Soldin
cr.ex. (Hunt)

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THE COMMISSIONER: I think he is trying to get the answer. Perhaps now that Mr. Roland has put the question, perhaps now you can answer it, do you think. What prompted it?

THE WITNESS: Many things prompted it. One was, I have been trying to tell you, when we found digoxin measurements in patients that were not on digoxin. That was a key finding. It led to this research. I would say that the momentum of the research really picked up in May. At the beginning of May I wrote to Dr. Kuksis, who is one of the scientists at the Best Institute and he is an expert in mass spectrometry and I indicated, written at the beginning of May, that I would like to undertake this project, a collaborative project with him and that that project would involve high-performance liquid chromatography, separation of digoxin and Substance X. Identification of these two by mass spec. after we've carried out -- it would involve a lot more, it would involve the clinical pharmacology of Substance X, et cetera. This is all in the letter which I wrote to Dr. Kuksis dated early May. There are a number of problems when you start off a project of that type.

MR. HUNT: Q. Well, I don't want



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to get into problems just yet. I take it that what you are saying is that the basis of the research, the questions that it looks into are questions that didn't just crop up in May, they had come to you over a period of time?

A. They had incubated for some time.

Q. All right. And there would have been nothing to prevent the research project starting in March or February or the year before if you had decided it was appropriate to do it?

A. Well, the evidence built up slowly. We found elevated digoxins, I think it was in January on Ward 7C/D when we screened all those kids that had been given epinephrine. So, I think that was in January that was really the major tip-off for us.

Q. That was 1982?

A. Yes.

Q. All right. So, we are '83 now.

A. So, that was really the major tip-off.

Q. That is fair enough. My



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point is, there was nothing that would have prevented the project from sort of being undertaken any time after that right up until May of '83?

A. No, it could have started in '82, you're quite right.

Q. So, was there something that happened then in '83, in April of '83 that caused the project to begin in May?

A. Well, you are suggesting there was.

Q. Well, I am asking you, sir.

A. No, I just wrote this letter.

Q. It seems coincidental. I tell you I am not suggesting anything sinister about it but it seems coincidental and maybe that is all it is, but I am just asking, is there any relationship between the two, the project and the Commission?

A. Well, I can't give it to you. All I can say is in early May I wrote this letter. I wrote it. I had discussions with Dr. Goldberg who was very enthusiastic about us getting involved in a digoxin project.



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TORONTO ONTARIO

Soldin
cr.ex. (Hunt)

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Q. All right. Now, your
research has gone on from May right up until today,
I guess?

A. Right.



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Q I guess you are getting information all the time?

A Yes.

Q Last night you probably got information, did you?

A This morning, yes.

Q This morning?

A Yes.

Q So we are really at the front of the whole research project right here and now, aren't we?

A No, I am. You aren't.

Q That is right, sir. Well, you --
THE COMMISSIONER: Well, we might get credit for a little push, I don't know.

MR. HUNT: Q Over that five months then, sir, you have isolated Substance X?

A We have isolated a material, yes, which you can call Substance X.

Q Well, when we talk about Substance X I guess we are using it in terms of the endogenous digoxinlike substance that was found in babies and reported to us, the Commission, by Dr. Seccombe back in June or July?

A Yes.



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Q. Now are we talking about the
same Substance X?

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A. I don't know.

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Q. I see. So you have isolated
another substance?

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A. I have isolated a substance
from the urine of patients who are given a water load.

8

Q. Yes.

9

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A. Of people who are given a water
load. Not patients.

11

Q. All right.

12

A. Who are normal adults.

13

Q. Have you isolated the same
substance in babies?

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A. No, I haven't.

15

Q. Well then I take it --

16

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A. Are you saying have I purified
the substance from the blood of babies?

18

Q. Yes.

19

A. No.

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Q. No. All right, and have you
purified the substance from the tissue of babies?

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A. No.

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Q. Well then your request yesterday
for the samples I take it was to allow you to see what

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you could do with them within the parameters of your research project as it stands right now?

A. Certainly, yes.

Q. When you indicated that, and I used the word this morning because I took it from your statement that you made yesterday that you have developed assays for the measurement of digoxin by liquid chromatography as well as by mass spectrometry that definitively show that this compound is digoxin and cannot be anything else.

I take it that is only part of your total research project, that aspect that you referred to yesterday?

A. Right.

Q. Well, is what you asked us for then you want the samples back so that you can pursue your research with the samples?

A. My research involves essentially Substance X, what it is, what it does, and its purification and properties. I am very interested in that area. I think that this Commission --

Q. I am sorry. I take it you haven't done it yet on the blood or the tissue of babies?

A. No, I have not.

Q. All right. What you want from us,



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2 from the Commission, is the tissue and blood samples
3 of any of the babies that are still available. And
4 I am putting it to you that you want those, and I
5 am not suggesting anything sinister here, but I am
6 putting to you you want those to work on for the
7 purposes of your research?

8 A. Well, I think the Commission is
9 going to at some point have to address the issue of --

10 Q. Sir, could you just answer that
11 question.

12 A. I am trying to answer the
13 question.

14 Q. Does it admit of a yes or no
15 answer? You want those samples for the purposes of --

16 A. No, I --

17 Q. -- of doing your research?

18 A. No, I disagree because my research
19 is as I said associated with Substance X.

20 Here we are looking at another question
21 and the question is what this Commission is all about,
22 what did these children have, what is this they had?
23 Did they receive digoxin or is this an endogenous
24 material such as Substance X?

25 Now it so happens that our research
on Substance X has led us to develop procedures which



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can separate Substance X from digoxin and can definitively identify both these materials, Substance X and digoxin.

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Q You have done that in the urine of patients who were water loaded?

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A Right. When we say Substance X again, I emphasize that this need not necessarily be the same material that gives rise to digoxin activity in blood. It probably is very similar. It could be the same.

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Q Sir, isn't it obvious, and again I am not suggesting anything untoward here, but you want the samples that the police and the Centre for Forensic Science have so that you can run the test that your research project has developed, and that you are working with now and you are still in the stage where you don't want to talk about. You want to see what you get?

18

19

A Let me put it another way, I don't mind not getting these samples --

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Q Well, we are not saying that we --

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A Well, let me finish, please. I don't mind not getting these samples. If the Commission wants to arrive at some conclusion on as to whether this is Substance X and



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digoxin, they may approach us and I will be happy to help them with that. But I am not pressing for these samples. I just indicated that we may be able to help you in this area.

Q Well, if some other organization that is interested in the same subjects, the same issues as you come to the Commission and ask for the samples to use then, is there any way we can sort of weigh out the merits of the various research groups that we should dispense the samples to?

A. You can do whatever you like.

THE COMMISSIONER: Well, no, but just try to help us, Doctor. Don't get into a row with counsel.

Can you, if you get a sample, can you tell us or do you think you can tell us how much of what is in it is digoxin and how much of it is Substance X?

Do you think you can do that? Have you done that on any serum so far from anybody?

THE WITNESS: We have purified --

THE COMMISSIONER: Adults or child or anyone?

THE WITNESS: We have purified samples of Substance X from urine as I have indicated.



F.7

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2 There isn't enough Substance X usually
3 in serum for serum to be a good source.

4 As you know, patients with renal
5 failure or premature infants might have Substance X
6 at concentrations which correlated at no greater than
7 4 nanograms per millilitre of dogoxin. In other words,
8 very low concentrations.

9 I am merely giving water load experi-
10 ments. One can isolate digoxinlike activity in much
11 greater amounts from urine very easily, painlessly,
12 and this material can then be purified and Substance -
13 the dig.-like material can be identified and we have
14 done that.

15 Whether this Commission decides to
16 give us tissues or blood samples is their, you know,
17 it is something in their judgment that they can do
18 or not do. I really don't mind what they do.

19 MR. HUNT: Well, the Commissioner's
20 question was whether you had ever separated the
21 Substance X in serum, blood serum?

22 THE WITNESS: I said no.

23 MR. HUNT: Q. All right.

24 A. Three times.

25 Q. And I take it you haven't
separated it in tissue either?



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A. No.

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Q. All right. So that to that

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extent what would come of your testing these samples

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is speculative and as it involves the application of

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your research to something that has never been

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applied to before?

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A. But that is the nature of this

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proceeding. I mean you have got to find out at some

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point whether these samples contain digoxin or whether

they contain Substance X.

11

Q. Well --

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A. At some point this Commission is

going to have to face that.

13

Q. And maybe, sir, at some --

14

A. Now I don't mind which lab they

15

give the samples to. It makes no difference as long

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as they give it to a good lab, but at some point

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somebody is going to have to analyze these samples

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and assess whether the samples contain digoxin or

Substance X.

19

Q. Well, sir, you wouldn't want

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to use up all of the samples in an experimental phase

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of working out a methodology, would you?

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A. I certainly wouldn't. In fact

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I don't want to get these samples for quite a while

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yet.

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Q. Well, you see the trouble I am having is I took from your unsolicited statement to the Commission at the close of the evidence yesterday that you had worked out a tried and true and tested procedure that was going to give us the definitive answer with respect to Substance X and digoxin in the tissues and serum samples that may be left.

Now that may be my fault, but if I took that from what you said it appears now that I am wrong?

A. We could try and help you in that way.

Q. And --

A. If you wish. If you don't wish, that is fine.

Q. Sir, you can appreciate, though, can you, that we have to be relatively careful about what we do with the samples of tissue and serum that may be remaining?

You asked us yesterday not to break them up and give them out to individual groups?

A. Right.

Q. So I take it you appreciate we have to be careful what we do with them?

A. Well --



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Q Just that question.

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A I would hope that you would be more careful than you have been perhaps in the past.

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Q Oh, I see.

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THE COMMISSIONER: What are you referring to now?

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MR. HUNT: Q Sorry. What are you referring to now, sir?

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THE COMMISSIONER: Give me a chance to think about that now. Now whom were you referring to who has not been careful?

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THE WITNESS: Well, it depends. You have crucial material. Material that one has to deal with very carefully.

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MR. HUNT: Q We appreciate that. Just answer the Commissioner's question. Where haven't we been careful in the past?

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A Well, I am somewhat critical of the way some of these samples were analyzed as I have already stated.

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Q Yes. You set out - the last time you set out - the last time you were here and I can read you the pages where you set out the concerns you had, and you indicated you didn't know enough about the procedure then to comment any further.



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A. Right.

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Q. And we have what you said today.

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A. And I am still as critical as

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I was then.

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Q. Fair enough. And then --

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A. And on those grounds I made today.

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Q. And based on that you are saying

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we haven't been cautious or there hasn't been caution
exercised in the handling of samples?

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A. You seem to be - well, you seem

11

to be more cautious when it comes to thinking about
giving samples to our lab, yes.

12

Q. Well, sorry, I don't understand

13

that at all. What do you mean we seem to be more

14

cautious when it comes to thinking of giving samples

15

to your lab?

16

A. I mean exactly what I say.

17

Q. Well, I don't understand it. Can

18

you explain it?

19

THE COMMISSIONER: I don't either,

20

Doctor. That doesn't help us. What is it? What do
you mean?

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THE WITNESS: Well, there was an

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inference that we wouldn't be analyzing these

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materials appropriately. You have made that inference.

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THE COMMISSIONER: I thought the inference was that the material might be used up without any results coming from it and then we would have nothing to experiment on.

THE WITNESS: Right. And that is always a possibility. And would caution you against that, but there is nothing that I or any other analyst --

THE COMMISSIONER: Well --

THE WITNESS: You know they cannot guarantee getting results on these samples.

MR. HUNT: Q. When was the inference made by me or anybody else that those shouldn't be given to your lab for any particular reason?

A. Something that I have taken from your questions.

Q. I see. So from the questions I have asked you here this morning that is what you have taken?

A. Right.

Q. You agree that we are concerned as the Commissioner pointed out with the materials being used up?

A. Yes. I am concerned too about that.



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Q. Well, I guess to go back to my original question a few moments ago if I take from what you said yesterday that you had a tried and true procedure worked out through your research that was going to give us the definitive answer as to whether or not the tissues and serum that we had contain digoxin or Substance X I was wrong?

A. Well, we have never isolated Substance X from tissues or serum. We would have to try and do that. We have never done that.

Q. Wouldn't you feel a lot better about the procedure if you tried that and had done it and you could come to us and say here are our results from trying it on tissue and serum in babies over the last number of weeks or whatever?

A. But you would have to find a patient who had values of around 70, number one. These patients --

Q. No question, sir. It may be difficult for you to find --

A. Impossible to find.

Q. But nonetheless wouldn't you feel a lot more comfortable with your procedure if you had tried it in those situations?

A. Yes.



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Q And then you came and told us
that you could give us the definitive answer?

A Yes.

MR. HUNT: Those are all the questions
I have.

THE COMMISSIONER: Yes. Thank you,
Mr. Hunt.

Mr. Young?

MR. YOUNG: Thank you, Mr. Commissioner.

CROSS-EXAMINATION BY MR. YOUNG:

Q Doctor, I understand that you
told us yesterday and you told Mr. Hunt this morning
that the highest level of this Substance X, this
endogenous substance, that anyone has recorded to date
is approximately 4 nanograms per millilitre?

A Right.

Q And I think you told us that you
are now able, and I am being a little repetitive
with respect to Mr. Hunt's last questions, but correct
me if I am wrong, you are able to identify this
Substance X to isolate it with respect to urine
samples. Is that correct?

A That is correct, yes.

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Q. And when did you become able to do that, Doctor, was it approximately 10 days ago?

A. No, it has been an ongoing study, it has taken many months to develop. All I can say is over the last five months we have developed a procedure which approximately 10 days ago we gave a sample for mass spectrometry analysis.

Q. And that is where you became a little more certain that you could isolate this particular substance?

A. Right.

Q. Doctor, I also understand you have been quite active in the therapeutic drug monitoring program at the Hospital?

A. Yes.

Q. And in the course of that program I take it you have done many, many digoxin assays?

A. Yes.

Q. Doctor, I further understand that since March of 1981 digoxin assays, postmortem digoxin assays have been done on every child who is autopsied at the Hospital for Sick Children, I imagine you are aware of that, are you not? That is the statement Dr. Cutz made here last week, or a week



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prior to that. I can get it and read it to you.

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A. No, I believe what you say.

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I thought I had somewhat different information from
Dr. Phillips, but anyway.

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Q. It was Dr. Cutz that said that,
but what information do you have?

7

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A. I wasn't sure that we had
autopsies happen on every death at the Hospital.

9

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You can ask Dr. Phillips, I mean you will get it from
him rather than from me.

11

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Q. We will do that. What criteria
did you think was used in order to decide --

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A. I think in almost all the deaths
they did have, certainly the vast majority.

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Q. Doctor, you have some involve-
ment with the testing of these samples that are taken
during autopsy, you had more involvement at various
times?

18

A. Right.

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Q. But you still had some involve-
ment, and you did have some involvement and you
probably had been involved in, would it be correct
to say dozens or hundreds of postmortem, tests of
postmortem blood samples?

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A. I think that since this time



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period there have been over 700 altogether.

Q. That is since March of 1981?

A. Yes.

Q. Doctor, these children that are autopsied at the Hospital some of these children clearly would have been on digoxin during their lifetime?

A. Yes.

Q. And some of them wouldn't have been?

A. Right.

Q. Some of them would have been from the cardiac ward?

A. Right.

Q. And some of them wouldn't have been?

A.. Right.

Q. Some of these children would likely have been the subject of resuscitation, unsuccessful resuscitation attempts prior to their death, would you expect that to be true?

A. Yes.

Q. And during these resuscitation attempts I imagine that we can safely assume that electric shock was used and large amounts of



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2
3 adrenalin were used in order to try to bring these
4 children back to life?

5 A. Yes, some of those.

6 Q. Yes, certainly not in all of
7 them.

8 A. In a few maybe.

9 Q. Doctor, before we leave that,
10 I understand you were involved on testing of Baby
11 Murphy who died in April of 1983, is that correct?

12 A. Yes.

13 Q. And this child had postmortem
14 digoxin levels, you can help me, Doctor, I think it
15 was in the neighbourhood of 20 or 30 nanograms per
16 millilitre, is that right?

17 A. Right.

18 Q. And there was a coroner's
19 inquest with respect to this child's death?

20 A. Yes.

21 Q. And the conclusion was reached
22 as to this child's cause of death I believe?

23 A. Yes.

24 Q. You told Miss Cronk yesterday
25 and you told the Commissioner that prior to the
end of March of 1981 I believe you said you had never
seen a digoxin level of 70 or greater?



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A. Right.

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Q. And Doctor, in all of the

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many hundreds of tests that you have done prior to

5

March 1981 have you ever seen a digoxin level of

6

70 or greater?

7

A. Since?

8

Q. Yes, since March of 1981?

9

A. No.

10

Q. And have you seen a digoxin

level of 50 or greater since March of 1981?

11

A. Due to contamination that is

12

possible.

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Q. And you told us about that.

14

A. Apart from that.

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Q. You have not?

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A. No.

17

Q. What is the highest digoxin

level?

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A. I would have to check that.

19

Q. We have already spoken about

20

Murphy, but can you give me a rough idea?

21

A. It would be under 20.

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Q. And Doctor, some of these

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children who have been tested, whose blood has been

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tested after the autopsy went through this electrical

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G6 1 shock and high doses of adrenalin and underwent
2 all of these procedures and some of them were on
3 digoxin as we discussed; would you not agree with me?
4 And I ask you to consider one more point and we
5 just discussed that, the fact that levels of
6 substance X have only been recorded up to 4 nanograms
7 per millilitre. Would it not be true that in view
8 of all these facts it is rather unlikely that
9 substance X is going to explain away the 72's and the
10 78's that we saw in the Hospital in March of 1981?

11 A. Unlikely, I can't give you
12 statistical - it is possible, but it is unlikely.

13 Q. It is rather unlikely; it is
14 quite unlikely?

15 A. I think it is possible.

16 Q. How would you rate that
17 possibility, do you think there's a good possibility,
18 Doctor, a good chance?

19 A. I don't want to rate it. I
20 think there is a possibility and I don't think it is
21 that minor a possibility.

22 Q. Well, Doctor, can you tell me
23 how you think these levels can be explained away by
24 substance X after all that we have discussed? I mean
25 what is going to be the missing factor, what do you



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2 suspect to be the missing factor? You suggested
3 yesterday it might the resuscitation attempts, and
4 we have already spoken about the fact that many of
5 the children, some of the children that you have
6 tested over the last two years, two and a half years
7 likely underwent such resuscitation attempts?

8 A. Yes. We are walking on new
9 ground yet as I am sure you are aware, and therefore
10 one has to be cautious about saying that something
11 could not give rise to a value of 70 or 80. I will
12 not say that, I think it possibly could. All I am
13 saying is it possibly could, I'm not saying it did,
I am saying it possibly could.

14 Q. Can you help us with how that
15 might happen with your present state of knowledge,
16 do you have any idea about what extra factor might
be in there?

17 A. One could surmise a million
18 different things. Substance X may be a hormone
19 which is present in a particular tissue and if you
20 get breakdown of that tissue substance X might be
21 released in amounts sufficient to give you - it is
22 conceivable in amounts conceivable to give you values
of 70 or 80.

23 Q. But of all the children who have
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died at the Hospital for Sick Children since March of 1981 that has never happened?

A. That is correct.

MR. YOUNG: Thank you, Doctor.

THE COMMISSIONER: Yes. Now, Miss Jackman.

MS. JACKMAN: No questions, Mr. Commissioner.

THE COMMISSIONER: Mr. Olah?

MR. OLAH: I do, but I will be a while. Would you like to take a break now or would you like me to commence?

THE COMMISSIONER: Whatever you wish I suppose.

MR. OLAH: I will be a while.

THE COMMISSIONER: All right, we will take 20 minutes.

---Short recess.



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---On resuming.

THE COMMISSIONER: Yes, Mr. Olah.

MR. OLAH: Miss Jackman would like to ask some questions, Mr. Commissioner.

THE COMMISSIONER: Yes, all right.
Miss Jackman.

CROSS-EXAMINATION BY MS. JACKMAN:

Q . Doctor, I have just a few questions.

Doctor, when you testified previously on July 7th you mentioned that Dr. John Gault in Newfoundland had been conducting studies. Have you found out the results of those studies?

A. Well, I have some of his data, yes, the data that he has published, I have read that.

Q. Can you make a copy of the data that he has published and make it available to us?

A. Certainly, yes.

Q. Then, secondly, you mentioned that Candy Cheong had done some of the assay runs on the Miller sample?

A. Right.

Q. And that on the Sunday



1
2 following another person in the lab had done some of
3 the assay runs?

4 A. Yes.

5 Q. You also stated that you had
6 reviewed the procedures that they had used. How
7 did you review the procedures? Like, what does a
8 review of their procedures entail?

9 A. Well, one looks at the curve,
10 that standard curve, one looks at whether that is
11 appropriate, one looks at the control values obtained.

12 Q. So, it is reading that they
13 have written down?

14 A. No, it is reading what the
15 standard curve - yes, it is reading the counts that
16 one would get in a radioimmunoassay. We have been
17 through this when we discussed what a radioimmunoassay
18 was. It is a long time back. But you get different
19 numbers of counts when you have different concentrations
20 of digoxin in a sample. So, you would review that
21 using standards and then you would review the results
22 for the controls and then you would look at the
23 results for tests.

24 Q. Then, Doctor, I understand
25 that you were satisfied with the way those tests had
been handled. I would like to know just a bit more.



1
2 Do you know how long Candy Cheong, for instance, had
3 been at the Hospital, how much experience she had had
4 in doing those kinds of tests?

5 A. You had better ask Dr. Ellis,
6 she works in his lab. She has been with us a long
7 time.

8 Q. And the other technician?

9 A. Also a very long time. Both
10 of them have been with us I think at least five years.

11 Q. And they have been doing these
12 kinds of tests?

13 A. Yes.

14 Q. Throughout that time period?

15 A. Right.

16 MS. JACKMAN: Those are all the
17 questions I have.

18 THE COMMISSIONER: Thank you, Miss
19 Jackman.

20 Mr. Olah?

21 CROSS-EXAMINATION BY MR. OLAH:

22 Q. Doctor, I would like to follow
23 up on some questions that were asked by Mr. Hunt.

24 First of all, I take it that the first
25 indication you had of substance X, or something
unusual occurring, was in January of 1982 when you



4
1
2 had the results of the digoxin test taken on Wards
3 7C and D, was it?

4 A. Right.

5 Q. And at that time there really
6 wasn't any theoretical explanation for the
7 phenomena that you observed. Am I correct in under-
8 standing that?

9 A. I would have to review the
10 literature at the time. There were a few papers
11 that were published around that time talking about
12 endogenous digoxin like material.

13 Q. All right.

14 A. But apart from that.

15 Q. That was a theory that really
16 didn't have much currency or acceptance at that time,
17 as I understand it?

18 A. Yes, I think you are right.

19 Q. And, in fact, the development
20 of this substance X theory occurred some time between
21 January of 1982 and April of 1983 when Dr. Seccombe
22 published his publication that we have seen?

23 A. Yes.

24 Q. And I take it that it was in
25 that environment of this developing controversy
about substance X that you came up with a mode of



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refining substance X?

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A. Yes.

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Q. And all that you are telling this Commission is that you have developed a mode or a technique that is more specific than RIA for isolating substance X?

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8

A. Yes, and differentiating it from digoxin.

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Q. That's right, because the problem with the RIA system, as I understand it, is that it cannot distinguish, or we don't believe that it can distinguish between substance X and digoxin?

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A. Yes.

Q. And what this new mode that

you have applied, which is a more developed or refined technology or application of technology allows the precise separation of digoxin and digoxin like substance such as substance X?

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22

A. Yes.

Q. So, what you are suggesting by the release of samples is really the application of the highest available technology known to mankind today in isolating or separating substance X from digoxin?

23

24

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A. Yes. I was suggesting that



1
2 that would be a way to differentiate between these
3 two in these particular samples.

4 Q. And that would hopefully forever
5 lay to rest any speculation or suggestion that these
6 high readings are as a result of substance X or
7 something digoxin like rather than digoxin. It
8 possibly could ---

9 THE COMMISSIONER: It depends on which
10 side you are on.

11 MR. OLAH: It depends. Well, it
12 doesn't matter which side we are on, I guess, Mr.
13 Commissioner.

14 THE COMMISSIONER: Well, you said
15 hopefully.

16 MR. OLAH: Hopefully, yes.

17 THE COMMISSIONER: Yes.

18 MR. OLAH: Well, let me recast the
19 question, Doctor.

20 Q. What this technique, the
21 application of this technique could do is to tell
22 us whether in fact to what proportion substance X
23 impacts on these readings?

24 A. Well, I think, you know, if
25 successful, if one was given a tissue sample let us
say from Justin Cook, a heart sample, and if we



1
2 measured, if we used these techniques to measure
3 digoxin in that sample and if we found no digoxin
4 to be present yet when we used the same techniques
5 on other heart samples in patients that have been
6 receiving digoxin and if we then found digoxin to
7 be present in those other ones, we would then be able
8 to say that the samples from Justin Cook didn't have
9 any digoxin in them. We may as well be able to look
10 for substance X because the procedures we have
11 developed essentially enable us to look at both of
these materials.

12 Q. Well, I am not sure I under-
13 stand that, let me see if I do.

14 You have now developed, or you have
15 successfully satisfied yourself that the process that
16 you have applied can measure out digoxin or separate
out digoxin and substance X. Am I correct?

17 A. Yes, that is correct.

18 Q. And that was on urine samples?

19 A. We can separate out digoxin
20 in substance X.

21 Q. All right. And what in effect
22 those most recent testing has done has satisfied you
23 that the application of this liquid chromatography and
24 mass spectrometry in fact works in separating out
25



1
2 substance X and digoxin?

3 A. Yes.

8
4 Q. And so far it has been run on
5 urine, as I understand it. You are going to have to
6 say yes or no?

6 A. Yes.

7 Q. And the reason that urine was
8 used is because you can get fairly high levels of
9 substance X in urine?

10 A. It was a much, yes, the source
11 was a good source to use to purify substance X from.
12 There is very little substance X present as we know
13 in blood.

13 Q. In blood, all right. And now
14 that the system or the technology is operating
15 satisfactorily you want to move on or you think that
16 you could move on to something different, a different
17 mode or a different substance possibly containing
18 substance X which would be blood or plasma?

19 A. Blood or plasma, depending on
20 the concentration of substance X in that sample.
21 You know, it may or not be possible to do this
22 particular series of experiments and that's why I
23 am hesitant.

23 Q. That's the point I was coming
24
25



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2 to. That's why you are hesitant. You're not sure to
3 what extent substance X would be found in these samples
4 of blood?

5 THE COMMISSIONER: But assuming it was
6 there, surely that's the problem Assuming it is
7 there, Doctor, would you have a problem in finding it
8 in blood?

9 THE WITNESS: Well, it depends on the
10 concentration at which it is there.

11 THE COMMISSIONER: Yes, but if it is
12 a small concentration you would have trouble, is that
13 correct?

14 THE WITNESS: Yes, I think we would
15 have trouble if it was a low concentration and if it
16 was a high concentration I think it would be much
17 more easy.

18 THE COMMISSIONER: That wouldn't worry
19 us because if it is a low concentration then it
20 wouldn't be of importance but if it is a high
21 concentration it would be of importance You say
22 that you think your system would detect high
23 concentrations of substance X in blood?

24 THE WITNESS: I think it would,
25 provided we had (a) a high concentration and (b) a
big enough sample. So, I am sorry that I can't be



1
2 more explicit than that at this point. We have never
3 done it from that source.

4 THE COMMISSIONER: Well now, I
5 realize that I think you said yourself substance X,
6 and maybe I am over-stating this, but it has never been
7 found in concentrations, or seldom found in con-
centrations of higher than 4 nanograms?

8 THE WITNESS: Right.

10 THE COMMISSIONER: Would that be
11 sufficient? Say 4 and 72, would that be sufficient?

12 THE WITNESS: You're asking me to ---

13 THE COMMISSIONER: If you have no idea
14 whether it would or not, just say so.

15 THE WITNESS: I think it probably would
16 be if the concentrations were around 72 and if the
17 concentrations -- but it always depends on the volume
18 of material you would give us.

19 THE COMMISSIONER: I see.

20 THE WITNESS: So, there are two factors
21 here: one is concentration and the other is volume.
22 If we were given a big enough sample with a high
23 enough concentration I think we could use these
24 techniques to separate.

25 MR. OLAH: Q. Well, on the converse
side of the coin, Doctor, would it be fair to say



1
2 that if your system doesn't pick up substance X then
3 we can be fairly certain that the reading is accurate
4 in terms of digoxin and that it does not contain any
5 digoxin like substances?

6 A. Well, I would be hesitant
7 about that one. There may well be more, as you know,
8 more than one compound which has dig. like activity.
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Q. So we are now talking about substance X, Y and Z possibly?

A. Right. There could well be a series of compounds.

Q. And is there any basis for suggesting that or is that just theoretical at this stage?

A. I usually - no, there is some basis for that.

Q. All right. Let's just go back to the question I asked you a moment ago: assuming that your instrumentation doesn't pick up any indication of substance X or possibly other digoxin-like substances, can we then fairly safely assume that the readings we have heard in evidence here can be relied upon as being digoxin and fairly accurate digoxin levels?

A. No. Yes, I am hesitant about the values that - about the interpretation of values that have been found.

Q. Well, I am somewhat at a loss and maybe you can tell me why you have that problem?

A. Well, the issue is - the problem is, as I said, a value of 72 nanograms per ml of digoxin is that really digoxin, and I have a problem



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saying that it definitely is.

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Q. Well --

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A. It may be caused by substance X

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or Y or Z or whatever you want.

6

Q. All right. But given the highest

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and most sophisticated mode of detection available to

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us today, which I understand is this new system that

9

you have developed, there are only two possible

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alternatives: one is the application of your system

11

reveals the presence of these substances, in which

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case we will be able to say to what extent it is

accurate --

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A. That is right.

14

Q. Or alternatively, it doesn't

15

detect it and then we can, can we not, readily say

16

that it is in fact accurate because you have not

been able to detect --

17

A. As long as --

18

Q. -- substance X, Y or Z?

19

A. As long as it detects digoxin,

yes.

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21

The process has to detect either

22

digoxin or substances X, Y, Z or any other dig. like

material.

23

Q. Well, is there any doubt that

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your process in fact does detect digoxin?

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A. No. You can detect digoxin

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using this method.

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Q. So that as long as you have

6

got sufficient volume and a fairly high digoxin

7

reading, if your system fails to detect digoxin-like

8

substances X, Y or Z, then can we not be fairly

9

certain that in fact readings we have are digoxin?

10

A. Yes. Under those circumstances,

you can be sure they are.

11

Q. All right. So in fact if there

12

are sufficient samples left, and I am just talking

13

about blood at the present time, then your testing

14

would help us either way because either it will

15

detect high levels of substance X or Y or Z or it

16

will not, and in which case we will be able to say

it is digoxin and not some other substance.

17

A. If you detect digoxin you will

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be able to say it is digoxin. If you don't detect

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digoxin I think the question is still open.

20

Q. All right.

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THE COMMISSIONER: Sorry. Could there

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be some question as to whether you would detect

digoxin in this?

23

THE WITNESS: In patients who haven't

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received digoxin you may - if this whole reading is caused--

THE COMMISSIONER: No, but what about the readings that were done under your supervision? Aren't they digoxin?

THE WITNESS: Yes, that is using either - that was using the radioimmunoassay procedure.

THE COMMISSIONER: But you now have some doubt about that system, the whole system?

THE WITNESS: Well, there is problems of specificity with that system.

THE COMMISSIONER: I understand that, but what Mr. Olah is saying, you now tell us that you can isolate substance X. If you take that and you can do that, doesn't the remainder become digoxin? Isn't the remainder digoxin?

THE WITNESS: The same procedure that we used to measure substance X can be used to measure digoxin. That is HPLC and mass spec.

If these infants were given digoxin we should therefore be able to detect digoxin.

MR. OLAH: Q. Fine. Let's use that example. What your technique does is it gives a very specific reading of the particular substance you



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2 are looking for? Right?

3 A. Right.

4 Q. All right. So if we were to
5 give you a blood or plasma sample from, say, Justin
6 Cook, and you looked for digoxin, and assume that there
7 is high levels of digoxin there, you would be able
8 to find it, would you not?

9 A. I would be able to find it if
10 it was there, yes.

11 Q. And you would be able to measure
12 the concentration? Right?

13 A. I think so. Well --

14 Q. And then after you have measured
15 that you would be certain, given the most sophisticated
16 application of science today as to (a) that it is
17 digoxin only, and the level that is contained in
18 that? Correct?

19 A. I think if one could rule - I
20 think we could definitively establish whether or not
21 digoxin was present. Right. I think if substances
22 X, Y and Z and possible others were not present, that
23 one could assume that the radioimmunoassay result
24 was accurate.

25 Q. Okay. And conversely if you
found high levels of X, Y or Z then that would cast



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great doubt on the readings we have got?

3

A. Yes. Right.

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Q. So either mode would be very

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helpful to this Commission? Isn't that what you are
6 saying?

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A. That is what I am saying.

8

Q. And presumably because you

9

have had the advantage of Mr. Cimbura's experimenta-
tion with respect to tissue you will be able to

10

use his research and apply your specific testing

11

mode and possibly come up with some sort of pretty

12

precise measurement with respect to tissue? Is

13

that what I am hearing?

14

A. I think that if we worked

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together it could be done, yes. One could come up

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with a good procedure that would separate, isolate,

17

purify and then measure digoxin in tissue samples

using HPLC and mass spectrometry.

18

Q. And what you are saying is that

19

this would take time, but given the advances that

20

you have uncovered it would give us a very

21

definite idea with respect to tissue as to either the

22

presence of digoxin or possibly digoxin-like substances?

23

A. I think it should, yes.

24

Q. By the way, have there been

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2 any recent developments, and I know we are on the
3 frontiers of science these days, have there been any
4 further recent developments in this area of substance
5 X that you are aware of other than your own studies?
6 Reports and the literature?

7 A. There is some very recent
8 abstracts, one by Galt, that you may or may not have
9 which I will make available to you.

10 Q. Perhaps you could assist us --

11 A. And he isolated digoxin-like
12 materials from patients with hypertension and normal
13 individuals.

14 Q. Was that using RIA or --

15 A. After using water load. Yes,
16 using radioimmunoassay.

17 Q. I guess what I am trying to
18 get at at this stage is this: given the most recent
19 knowledge as of today, first of all this Galt study,
20 was this with neonates or with adult patients?

21 A. No, those were with adults.

22 Q. Is there any recent change in
23 the levels that have been reported by Dr. Secombe
24 in terms of levels to be found in blood or plasma as
25 being the highest at about 4 nanograms?

A. Not that I am aware of, no.



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3 MR. OLAH: Thank you, Doctor. Those
4 are the questions I have.

5 THE COMMISSIONER: Just one thing
6 on this: you told me and I have a note here that
7 you would need a high concentration of substance X
8 and a high volume of blood to do your experiment.
9 But do you really need a high concentration of
10 substance X; if your system will differentiate
11 between substance X and digoxin why do you need to have
12 a large concentration?

13 THE WITNESS: Yes. I want to be
14 sure that we will be able to tell you, yes, there is
15 substance X present or yes, there is digoxin present.

16 THE COMMISSIONER: Yes.

17 THE WITNESS: One or the other or
18 both. The present purification procedure involves
19 multiple HPLC runs and involves at the end direct
20 probe mass spectrometry, possibly gas, GC mass
21 spectrometry, so it is a long procedure, and you
22 tend to lose material as you go along the procedure.
23 You never have a recovery of a hundred per cent. So
24 you always are losing material as you move with each
25 step.



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Therefore, one would need to have adequate concentrations of those compounds present in the sample, I think, in order to definitively establish that they were there. If the concentrations were very low, I don't think we would be able to detect them.

THE COMMISSIONER: You wouldn't be able to detect them, but it wouldn't prevent you from detecting the digoxin?

THE WITNESS: Providing the digoxin was at a certain level, yes, above a certain concentration.

THE COMMISSIONER: Yes. All right.
Yes, Mr. Labow.

MR. LABOW: I have no questions, Mr. Commissioner. Mr. Tobias and Mr. Shanahan have told me they also have no questions.

THE COMMISSIONER: Now, Miss Kitley, you were not around I think at the critical moment, have you any questions?

MS. KITLEY: I gather I was missed and I have no questions.

THE COMMISSIONER: Yes. All right.
Thank you.

Mr. Roland.



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MR. ROLAND: I think, Mr. Commissioner, that you have, in the last few minutes, covered and understood the areas that I want to make sure are clear in terms of the method that Dr. Soldin is talking about.

RE-EXAMINATION BY MR. ROLAND:

Q. Just so that I can understand that it is clear, as I understand it, Dr. Soldin, in order to conduct the study that you have told us about, using both HPLC and mass spectrometry, you would require a fairly large sample of the substance, whether it is digoxin or Substance X, to begin with because the process, I understand, is one of concentrating that substance; that is, removing all other substances from the substance you are going to put through the mass spectograph?

A. Right.

Q. Is that correct?

A. Yes.

Q. And that is why you run, as you said, multiple HPLCs?

A. Right.

Q. And the reason you have used urine is because that is the way in which you can gather fairly easily a sufficient quantity of the



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isolated substance?

A. Right.

Q. And I gather the reason you haven't tried it on babies, on serum of babies, is because, unless the concentration of the substance, be it digoxin or substance X, is extraordinarily high, you will not be able to isolate and separate out enough of the substance to run through your experiment?

A. You may not be able to, yes.

Q. And I gather your experiments have been directed towards identifying the substances rather than quantifying them?

A. That is right.

Q. That is the whole direction of your experiments?

A. Yes.

Q. When you talk about using the tissues and the blood serum of the baby, Baby Cook and other babies that we are concerned with, you are talking about identifying digoxin or digoxinlike substances rather than quantifying them?

A. At this point, yes. At this point, one could always work out a quantitative



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2 procedure but, at the present time, we are talking
3 about identification.

4 Q. Yes. And I gather that,
5 today, you feel that your procedure that you have
6 developed together with what you know about using
7 samples of tissue, either by dehydrating them in
8 order to then run them through the HPLC and
9 separate out the substances, or by using some sort
10 of a homogenation process, is sufficient for your
11 purposes, for your experiments today, if you have
12 enough quantities to identify in those substances,
13 in that substance, whether or not you have digoxin
14 or digoxinlike substances?

15 A. Yes, it should be.

16 Q. And it is for those
17 reasons, I take it, you thought it might be useful
18 to the Commission, to aid the Commission, for you
19 to attempt that process on what other tissue and
20 serum samples may be available?

21 A. Right.

22 Q. Recognizing, I gather,
23 that you require a sufficient quantity of both
24 tissue or serum in order to concentrate the substance,
25 the digoxin or dig-like substance, to concentrate it
and give you thereafter a sufficient quantity to



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run through your mass spectogram process?

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A. Right. Also recognizing

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that, before we ever embarked upon this, we would

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do numerous experiments of heart tissues in patients

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that have not received digoxin.

7

Q. Yes.

8

A. And we did numerous

9

experiments on heart tissues of patients that had
received digoxin.

10

Q. Yes.

11

A. So that we have a much

12

better feeling for the reliability of the procedure
were we to embark upon that line of investigation.

13

Q. And I gather, if we

14

simply take a baby, take a neonate, for instance,

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with what has been detected as a therapeutic reading

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of, say, 2 or 1.5, and it has not been on digoxin,

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the kind of thing that we have heard about from

18

Dr. Seccombe, and you took a sample -- and you wanted

19

to try and take a sample of that baby's blood in

20

order to determine whether or not substance X was

21

present and try to identify substance X, that

22

you wouldn't be able to obtain enough blood or

23

A. Yes. I think there may be

24

25



J6 2 a problem, but I don't know.

3 Q. In any event, when you
4 were asked, have you isolated substance X in babies
5 or in tissues, I gather what you have told us is
6 that it is not that you haven't isolated them but
7 you haven't tried to isolate them?

8 A. Yes.

9 Q. You haven't made that
10 attempt yet; your experiments haven't dealt with
11 that?

12 A. Our experiments haven't
13 dealt with that, no. The concentrations, as you
14 point out, are low, generally.

15 Q. Yes.

16 A. We would need a large
17 volume, presumably, of blood, and we would exanguinate
18 the patient, and it is not the way to go if you
19 wish to purify compound X; it seems a very poor
20 route to take.

21 Q. So, if you are provided
22 with samples of tissue and blood of the babies that
23 we are concerned with here and they are sufficient,
24 there is sufficient quantity of those samples to
25 conduct your identification method on, I take it
that you will be not quantifying digoxin or Substance



J7

1
2 X; you will be identifying digoxin or Substance X?

3 A. Yes. We would provide
4 a definitive identification, first of all. It is
5 possible that we could provide a quantitative
6 estimate as well, but one would have to work that
7 out.

8 Q. Have you developed a
9 methodology yet to quantify it with the present
10 process that you have?

11 A. We haven't evaluated
12 the process quantitatively.

13 Q. Yes, all right.

14 THE COMMISSIONER: Do I under-
15 stand that, if you were to have this experiment and
16 if there were certainly 2 nanograms of digoxin plus
17 X, you would be unable to tell us, first of all, how
18 many nanograms there were of the two together nor
19 of either one; is that right?

20 THE WITNESS: I think it would be,
21 at this time, very difficult to put a number on that,
22 yes.

23 THE COMMISSIONER: It seems to
24 have been relatively easy for everybody to put a
25 number on the total - we have got a whole book of
them.



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THE WITNESS: Yes. You have a whole book of numbers, that's true. What they mean is another issue.

THE COMMISSIONER: No, but they mean something; they surely mean D plus X, or perhaps D plus X plus Y plus X? Do they not mean that?

THE WITNESS: They mean --

THE COMMISSIONER: Do you mean this means nothing at all?

THE WITNESS: No. I am saying that, under the conditions of radioimmunoassays carried out, we got certain values for digoxin; that doesn't mean that it was due to digoxin. It could be --

THE COMMISSIONER: I understand that. You are telling me now, or at least I think you are telling me - and please correct me if I have misunderstood you - that you cannot now, under your system, even get a total of what may or may not be pure digoxin; is that right? Am I misunderstanding you?

THE WITNESS: If you are asking me whether I can do it right now, today, the answer is that, using HPLC and mass spec., we have not



J9

1
2 employed these techniques from a quantitative
3 aspect at the present time. We have done it from
4 the aspect of being able to identify digoxin and
5 identify Substance X.

6 THE COMMISSIONER: And in the
7 present state of the art, if you got these samples,
8 you would not be able to, provided there was any
9 Substance X at all -- I am sorry. If you got these
10 samples, whether there was or was not any Substance
11 X, you wouldn't be able to tell us how much digoxin
12 was in that sample?

13 THE WITNESS: I think, with a
14 minimum of extra work, we would be able to do that.
15 I haven't been trying to establish, up to this
16 point, a procedure to quantify digoxin by HPLC and
17 mass spec. What we have done up to this point in
18 time is develop a procedure by HPLC and mass spec.
19 which enables us to purify Substance X and to
20 identify what it is.

21 THE COMMISSIONER: But it doesn't
22 tell you how much there is of it?

23 THE WITNESS: It doesn't tell
24 you how much there is of it, right.

25 THE COMMISSIONER: And there are
apparently a great many babies that do have



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Substance X in small quantities and it really doesn't advance us very far?

THE WITNESS: It would tell you whether it is there or not.

MR. ROLAND: Q. And I take it, doctor, it would tell you whether digoxin was there or not?

A. Yes.

Q. And you might -- the result of your mass spectrometry is that you may find digoxin alone, you may find substance X alone or you may find digoxin and substance X?

A. Yes, and the quantitative aspect would have to be worked out, and will be worked out in the future.

Q. Yes.

A. Our work at this time is still not on this area. I mean, I have indicated to this Commission that we may be able to help in measuring digoxin or substance X in various samples but my research work doesn't involve that.

Q. But I take it, doctor, if we deal with the babies who at least we understand did not receive any therapeutic doses of digoxin, such as Baby Cook, you, if you had a



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a sufficient sample of either the tissue or blood serum from Baby Cook, you could tell us, indeed, whether or not there was digoxin or substance X or a combination of digoxin and substance X?

A. Yes. I think, with a minimum amount of extra work, we could quantify it as well.

Q. Now, in terms of the studies that you have been asked about that began in May in a serious and concentrated way, can you tell us, was funding an issue in commencing the studies, continuing studies?

A. Yes, funding is always an issue, and it was a major issue in getting this project started.

Q. Did that affect the timing of the project?

A. To a large extent it did, yes.

Q. And during the project, have you had to carry on looking for additional funding to carry you through the project?

A. Yes. We are continuously looking for additional funding.

MR. ROLAND: Thank you. Those are



J12

1
2 all the questions I have.

3 THE COMMISSIONER: Miss Cronk.
4 I am sorry, Miss Chown. This is your client.

5 MS. CHOWN: This is not my client
6 and I have no questions.

7 MS. CRONK: You were right the
8 first time, sir.

8 REDIRECT EXAMINATION BY MS. CRONK:

9 Q. Doctor, with respect to,
10 dealing with the latter matter raised by Mr. Roland,
11 the studies that you have been conducting, I would
12 like to gain a better understanding, if I may, now
13 that the matter has been raised, as to the exact
14 nature of those studies, and it may well be that,
15 at some subsequent date, if further results are
16 available to you, you may be invited to reattend, as
17 Mr. Roland suggested, by Commission Counsel or by
18 the Hospital counsel, to discuss this, but then,
19 again, this may not be the case. So, for present
20 purposes, I would like to explore that with you.

21 First of all, doctor, we have
22 heard in your prior evidence that, at the time with
23 which we are concerned - July 1980 through to March
24 1981 - the RIA method was the only one being used
25 in the Hospital for digoxin assays. Do I have that



J13

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correctly?

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A. Yes, you have that correct.

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Q. You told us, as well, about

5

your own subsequent involvement with the procedure

6

known as the FPIA, the Fluorescent Polarization

7

Immunoassay Technique, which is now used in the

Hospital.

8

A. Yes.

9

Q. Do the tests which you

10

have conducted, the water loading experiments that

11

you have been describing, involve either of those

two methods?

12

A. Both of them, yes.

13

Q. Do I take it then, doctor,

14

that you have, in addition to conducting these

15

water loading experiments by using the HPLC and

16

the MS method, as well run them on the RIA and as

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well run them on the FPIA method?

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A. Most certainly, yes.

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Q All right. So, you have used
then all three techniques?

A Right.

Q All right. Doctor, with respect
to the number of experiments, if you will, the number
of assays run on the RIA technique, the water loading
experiments, how many have you done since you
commenced this work?

A The number of assays run, single
assays?

Q As part of this water loading
experiment?

A Yes.

Q The research that you are doing?

A Yes, that we are doing.

Q Can you approximate it for us
at all? Are we talking about 10, are we talking about
50, are we talking about a couple of hundred?

A No, we are talking about some-
thing in the order of 10,000.

Q 10,000 individual assays?

A At least.

Q On the RIA technique alone?

A On the RIA and FPIA, yes.

Q Well, I am sorry. My question



K.2

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was directed to the RIA.

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A. The RIA. At the moment we are switching to FPIA, as you know. So, we have done far fewer on RIA. We have done well over a thousand RIA I would think, certainly around 10,000 FPIA.

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Q. All right. Then quite separate and distinct from those two methodologies, you have as well run a number of assays using strictly the HPLC and the MS technique. Do I have that correctly?

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A. We have, yes.

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Q. And then we are still talking about your water loading experiments. How many assays using that methodology have you run approximately since you commenced this research?

A. Well, you use the HPLC technique to purify Substance X and we have had to do multiple runs with that technique. We have done I would say close on a hundred runs at least, I would say. Somewhere around a hundred runs of HPLC. On mass spec. this is work done by Dr. Kuksis, he's done quite a bit. He has done mass spectro on samples which we have given him of digoxin, of the digoxin metabolites, of Substance X, and he has done them several times.

Q. All right. Well now, Doctor, I am confused for an entirely new and different reason.



K.3

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You have referred to another doctor running tests
using mass spectrometry.

4

A. Right.

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Q. Do I take it then that you have
not run assays since you commenced this research using
that technique?

7

8

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A. No. I know my limitations, I
am not a mass spectrometrists and we have an expert in
Toronto who is and Dr. Kuksis is.

10

Q. Is he at the Best Institute.

11

A. He's at the Best Institute.

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Q. All right. I take it then that
that flows from what I understood your previous
evidence to be and, that is, that mass spectrometry
had not been used for digoxin assays in The Hospital
for Sick Children and it still isn't?

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A. Well, Dr. Kuksis and I are
working together on that and we are collaborating on
this project together. I don't know where you draw
the line. I think that he is involved in this project
and the project is really taking place at Sick
Children's.

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Q. I understand, Doctor.

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A. Yes.

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Q. In terms of the actual testing

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K.4

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that you personally have done then, I take it, you have told us about the test that you have run on the RIA methodology, you have told us about the experimental runs that you have done on the FPIA and you have as well done I think you said approximately 100 runs on the HPLC?

A. Right.

Q. All right. When you have finished any particular assay run on the HPLC do you then send that specimen to your colleague at the Best Institute so that it may then be run on MS?

A. We send some of them, not all of them.

Q. So, we are not talking about a situation where those particular experiments are always done in combination. Any particular specimen is not always run on HPLC and then on MS?

A. No, no. What we have done essentially is in order to get sufficient material we have done multiple runs by HPLC. We have combined the fractions that have digoxin activity, we have then re-run them on HPLC, a different procedure, combined the fractions again, re-run them on HPLC, again a different procedure, combined the fractions, and this is continued until we are satisfied that we



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have a more or less pure form of Substance X, which we then give for either gas chromatography, mass spec. or for mass spec. and we have delivered several such samples.

Q. All right. Doctor, do I understand it then that in terms of these experiments and this research that you have been conducting, the very first step is to try and purify the substance by using the HPLC?

A. That's right.

Q. And it is only after you have done that to your satisfaction for the purposes of that particular run that you then turn to the RIA method or you then turn to the FPIA method, is that correct; in other words, does the HPLC run of the specimen precede any run of the specimen on the RIA?

A. Well, in order to detect -- at the moment our detecting device is either RIA or FPIA or mass spectrometry, so, it is one of those three. In order to detect Substance X we use RIA or FPIA. In other words, we measure the digoxinlike activity in all the column eluants.

Q. Yes, Doctor.

A. So, if we get, let's say every time we run a column we might have 40 different eluants



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that we collect. So, we would do 40 assays by FPIA on that particular run and we may or may not do it by RIA.

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Q. I see. But the first step in each case, in any case, whatever you subsequently do, is to try and purify the substance on the HPLC?

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A. Right. So, we have used the HPLC first.

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Q. All right. Then you would proceed to use one of the three other techniques, the RIA method, the FPIA method or you would send it to your colleague at the Best Institute to be run on mass spec.?

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A. That's not quite right. We always start - we have done a lot of chromatographic purification but in order to identify the acts of fractions, in order to identify where Substance X is, any time we run every single chromatograph we have to measure the activity of digoxin and we measure that with FPIA currently.

Q. All right. But you have also done, you have told us, some on RIA?

A. We have done some on RIA.

Q. And you have also sent some to your colleague at the Best Institute to be done on mass spec.?



K.7

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A. Only in the very pure form.

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Q. All right. So, far fewer have gone for that particular technique to be used, to your colleague at the Best Institute?

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A. That's right, yes.

7

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Q. All right. May we talk now about the specimens themselves, Doctor, and the patient, at least the sampling population if we may.

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As I understand your responses to Mr. Strathy yesterday you told us that you have run these tests on urine specimens from adults?

12

A. Yes.

13

14

Q. All right. Those adults I take it had no history of renal failure or renal dysfunction?

15

16

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A. Yes.

Q. All right. Those adults, as I understand it, had no cardiac problems. Do I have that correctly, they were healthy?

18

A. Yes, they were healthy adults.

19

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Q. All right. Were these adults who were working in the Hospital?

21

A. Yes, they were.

22

Q. Are these technicians in your lab?

23

A. Right, and myself and other investigators.

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K.8

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Q. All right. And how many individuals were involved in your sample group?

A. There are approximately 12, 13 individuals.

Q. All right.

A. At the present time.

Q. So, I take it then, Doctor, that you have taken a number of urine specimens from these individuals over the course of the last several months, have you?

A. Right.

Q. To run these tests?

A. Right.

Q. And you have told, and I assume of course that none of the members of the sample group have ever been on digoxin?

A. Right.

Q. All right. Doctor, you have told us as well, or at least I understood you to say to Mr. Strathy yesterday that you have also run some of these water loading experiments in respect of blood specimens. Did I have that correctly?

A. Yes, you do have that correctly.

Q. And were those blood specimens from the same individuals in the same sample group?



K.9

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A. Yes, they were.

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Q. All right. And if I understood

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what you indicated to Mr. Strathy yesterday, the

5

results of the assays run by these various techniques

6

on the blood specimens did not indicate, or did not

7

give you a reading which you could point to as being

8

indicative of the presence of Substance X or the

presence of digoxin. Do I have that correctly?

9

A. You have that correctly.

10

Q. But the urine specimens did.

11

A. They did, yes.

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Q. All right. So, when we talk

13

then, Doctor, as Mr. Roland has discussed with you,

14

about the merits of doing these tests on infant

specimens.

15

A. Yes.

16

Q. I take it, and you have told us,

17

that in order to do these tests on specimens of blood

18

from infants, you would need first a very large amount

19

of sample. Do I have that correctly?

20

A. Yes. I can't at this point tell

21

you how large a sample I would need and I can't tell

22

you what concentration I would require because I

haven't done that work.

23

Q. All right.

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K.10

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A. So, it would have to be looked at.

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Q. All right, Doctor. But whatever

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the volume of the sample, do I take it from what you

5

have said that in your mind you might require a

6

larger sample than you would from an adult?

7

A. No, the size of the sample will

8

be dependent on the concentration of Substance X in
the sample.

9

Q. All right. And that pertains

10

to blood specimens from infants?

11

A. Right.

12

Q. Right. Is there any reason

13

Doctor why these tests could not have been done or

14

could not now be done on urine specimens from infants

15

known to have renal dysfunction? I take it you haven't
done those tests?

16

A. It could be, yes, it could be done.

17

Q. But they haven't been done?

18

A. They haven't been, no.

19

Q. All right. And similarly, Doctor,

20

I take it there would be no particular reason why

21

you couldn't run these tests on urine specimens from

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children, infants with cardiac problems with some
degree of renal dysfunction?

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A. Could be done.

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K.11

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Q. That patient population clearly exists in the Hospital and it might be possible to do that?

A. Right.

Q. All right. And would there be any problem in doing that regarding the size of the sampling. Would you have any particular concerns?

A. Well, not with the urine sample, no.

Q. All right. So, there is no deterrent in that regard?

A. No.

Q. All right. Doctor, with respect to the results that you have thus far observed concerning these various tests, as I understood your responses both to Mr. Strathy and Mr. Roland, you have, on the basis of the urine specimens from these adults that you have tested, found an indication of the existence of Substance X in those specimens. Do I have that correctly?

A. Yes.

Q. All right. Is it Substance X alone, Doctor, or have you found as well other compounds that react in the same way or any similar way to digoxin, apart from what you are calling Substance X?



K.12

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2 A. We have found some activity in
3 other fractions of the chromatogram, so, there may
4 well be more than one compound. We have only
5 purified one of these. The fraction which has the
6 maximum activity is by far the largest percentage of
7 the activity.

8 Q. And that is what you are calling
9 Substance X?

10 A. That's what I am currently
11 calling Substance X, yes.

12 Q. But you have seen, as a result
13 of the assays on the urine specimens, you have also
14 seen the apparent activity of other compounds that
15 react like digoxin other than the one that you are
16 calling Substance X?

17 A. Yes.

18 Q. All right. The activity of
19 those compounds has also been measured by you as a
20 result of these tests?

21 A. It has, yes.

22 Q. And you have told Mr. Roland that
23 the purpose of the experiments to date as you have
24 carried them out, together with your colleague, has
25 been merely to identify whether or not Substance X
or, I take it, any of these other like reacting



K.13

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substances are or are not present in the specimen.

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Do I have that correct?

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A. That is correct, yes.

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Q. All right. So, I take it then, Doctor, that in all of the experiments that you have done since you commenced this research, you have not attempted, nor have you quantified or assessed the level or the amount of any of those substances that are present in the specimens. You didn't get an actual level?

11

A. Well, we have quantified the dig. activity.

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Q. All right.

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A. And we followed these materials by quantifying digoxin activity. All the way through, the whole thing is extremely tight. In other words, I can say we lose 20 per cent when we do this run, we lose 20 per cent of the activity. Everything is quantified in terms of digoxinlike activity.

19

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Q. All right. And when you say that you got no reading or no result on the blood specimens that were tested, I take it then that you were unable to measure any digoxinlike activity on those specimens?

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A. On the blood samples?



K.14

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Q. On the blood specimens?

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A. In adults being water loaded,

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right.

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Q. Yes, the ones you tested?

6

A. Yes.

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Q. Yes, all right, Doctor.

8

Doctor, my questions with respect to
the level or the quantification of your results flows
from the fact that you referred Mr. Strathy, as I
understood it, to the research that had been conducted
by Dr. Valdes?

11

12

A. Yes.

13

Q. And we know that he tested results
with known renal failure?

14

A. Yes.

15

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Q. All right. And as I understand
it, he also tested plasma or blood specimens of normal
newborn infants not known to have been on digoxin?

17

18

A. Yes.

19

Q. Do I have that correctly?

20

A. Yes, I am sure you have.

21

Q. And we have seen, you will
recall when you last testified that we marked as an
exhibit an article which you provided to us by
Dr. Valdes which spoke about the results of the

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K.15

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research on the infants.

It is my understanding that as a result of those Valdes studies he found a substance in the blood of those adults that he tested and as well in the blood of those infants that he tested which reacted on assay like digoxin was expected to?

A. Yes.

Q. Do I have that correctly?

A. Yes.

Q. And in that sense his research was similar to that of Dr. Seccombe from whom we have heard who also tested neonates known not to have been on digoxin?

A. Right.

Q. All right. And as I understand it, Doctor, the highest reading that Dr. Valdes found for this substance on either the tests that he did on the blood of adults or the tests that he did on blood of infants was 1.4 nanograms. Does that accord with your recollection?

A. I can't recall but that might well be it.

Q. Well, do you have any understanding as to what the highest recorded level was that Dr. Valdes observed as a result of his research?



K.16

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A. No, it was certainly under 4.

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Q. All right. Doctor, with respect to Dr. Seccombe of course we have heard his own evidence that the highest reading that he saw was 4.1 nanograms.

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7

A. Okay.

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Q. All right. And in asking you what the levels were that you obtained as a result of all your experiments to date, my purpose obviously was to put your results and your experiments in the context of those two other studies if it was possible to do so. And I take it that you do not have a quantification or a level, an actual level on any of the specimens that you have tested so far?

A. No. Well, if you are talking about the adult water load experiments?

Q. Those are the only ones you've done in that area, isn't it?

A. In this area - well, we have looked at a whole lot of premature neonates, as you know, and this was given in evidence before.

Q. No, I am talking about the water loading experiments.

A. So, we had the digoxin measured in those samples. But in adults that are being given



K.17

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water loads, no, we haven't found any elevated serum concentrations.

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Q. All right. And with respect to the urine specimens, Doctor, I take it you have been able to identify what appears to be Substance X, what you feel to be Substance X?

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A. Yes.

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Q. As well, you have identified at least the presence of two other compounds that appear to have reacted in the same way as digoxin. Do I have that correctly?

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A. Yes. There would appear to be two areas in the chromatogram that have digoxinlike activity apart from Substance X.

Q. All right.

A. Or what we are calling Substance X.

Q. Have you as well identified what appears to be a compound which appears to be reacting in a straight digoxin sense; in other words, have you had a specimen which you have tested since you have started this research that appears to contain both digoxin, Substance X and these other two compounds, or do you know?

A. I am sorry, I don't get that question.



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Q. All right. You have told us that you have identified substance X and you have also identified activity which appears to be related to a compound other than substance X.

Do I have that correctly so far?

A. Yes.

Q. Have you in any particular specimen found the combination of activity that Mr. Roland suggested as I understood him was possible, and that is the presence of digoxin in the urine specimen, the presence of substance X in the specimen and as well the presence of other compounds that react --

A. No, we haven't because none of these people have been on digoxin.

Q. That was my question.

A. None of these people have been.

Q. All right, thank you, Doctor.

Doctor, do you recall on the occasion of your previous testimony that you testified you had no personal experience as of that date in using the HPLC methodology for digoxin assays?

A. That is right, yes.

Q. You recall that?

A. Yes.



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Q. That testimony was given on
July 6th of this year?

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A. Yes.

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Q. And as I understood your
evidence and as I recall it you in fact said you
had at that stage never used HPLC to test for digoxin.
Do I have that correctly?

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A. We were about to commence at
that time. I think your question came a day or two
before we started our studies on HPLC of digoxin
itself, yes.

12

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Q. That was going to be my next
question, Doctor.

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Because you have now told us and
indicated to Mr. Strathy yesterday and others have
discussed it this morning that you have now developed
the HPLC assays such that it is possible to run
digoxin assays using that technique, and similarly
if I understood your evidence yesterday, you have
this combination of techniques, the HPLC and the mass
spectrometry which is available for digoxin assay.

21

Do I have that right?

22

23

A. We have developed a procedure
by HPLC which separates digoxin from its metabolites.

24

25

Q. Right. Isn't that the same



1
2 thing, Doctor?

3 A. You might be calling it the
4 same thing. If you are saying do I have an assay
5 that I would in inverted commas market as an assay
6 I would say no, I don't know, because an assay that
7 is marketable is one in which one can quantify the
8 results of digoxin in an unknown sample.

9 Q. I understand.

10 A. And at the present time our
11 method has been more how do we separate digoxin from
12 its metabolites; how do we separate it from substance
13 X, and can we identify these compounds and do they
14 have very different mass spectra, so this has all
15 been looked at.

16 Q. Doctor, I take it then when
17 you testified last on July 6th before the Commission
18 you did not then have in the Hospital to your know-
19 ledge an adaptation, if you will, of the HPLC method
20 which permitted digoxin assays to be performed; nor
21 do you today in the sense of a system that will
22 provide you with a quantitative result.

23 Do I have that correctly?

24 A. I wouldn't provide a quantitative
25 result today, yes, on a sample for digoxin using HPLC.

Q. And if I understood what you



L4 1
2 told the Commissioner you think that that could be
3 worked up in relatively short order?

4 A. Yes.

5 Q. But as the matter stands today
6 you couldn't get it to corroborate the result?

7 A. Right now I couldn't. You are
8 quite correct.

9 Q. So when you said yesterday that
10 you developed an HPLC and mass spectrometry
11 method for the measurement of digoxin you meant that
12 you have developed a technique that will show you
13 definitively whether or not digoxin is present in the
14 specimen that is submitted to that analysis but not
15 the amount of digoxin.

16 A. At that point in time, yes.

17 Q. All right. Doctor, I'm just
18 trying to understand the methodology.

19 A. Right.

20 Q. And what has happened, and
21 what is the case today as opposed to what the state
22 of affairs was in July.

23 A. Yes. Right.

24 Q. In respect to the HPLC method
25 that was available in the Hospital then, what have
you had to do to adapt it to permit you to now



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1
2 identify the presence of digoxin in any given
3 specimen? What did you have to do that wasn't the
4 case in July?

5 A. We haven't used it essentially -
6 sorry.

7 THE COMMISSIONER: Just a moment.

8 MR. ROLAND: Just one interjection
9 here. I don't want to let the examination go too
10 far along so that I am out of the chronology of things,
11 but Miss Cronk is asking about his experience with
12 HPLC in digoxin testing, and he indicated, the
13 witness indicated that he didn't have any at the
14 time he testified in July and that he began doing
these tests a few days later.

15 I am afraid at least with me and
16 perhaps a few others Miss Cronk left the impression
17 he didn't have any experience with HPLC, and that
of course --

18 MS. CRONK: I said for digoxin.

19 MR. ROLAND: In his testimony and
20 both in his curriculum vitae when he was introduced
21 the last time he has a great deal of expertise with
HPLC.

22 MS. CRONK: I am sorry. My question
23 specifically was for digoxin assays.
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3 I knew that, Doctor, and I was not
4 intending to suggest otherwise.

5 MR. ROLAND: It sounded to me that
6 Miss Cronk was suggesting she was launching into
7 new frontiers.

8 MS. CRONK: Well, I thought he was
9 doing that but maybe not in the way you suggested.

10 Q. Doctor, my question to you and
11 perhaps I have misconceived of the situation, is that
12 HPLC technique in July of this year was not used for
13 digoxin assays in the Hospital and accordingly for
14 that particular purpose you had no experience with
15 that technique for digoxin assay. That I have
16 correctly, do I not?

17 A. Yes.

18 Q. We now know that you are using
19 the HPLC technique as part of these experiments to
20 isolate and identify the presence of digoxin in any
21 given substance?

22 A. Yes.

23 Q. Was the technique capable of
24 doing that in July?

25 A. Easily.

Q. All right. So it is not then,
as I was about to ask you, a situation where you had



L7 1
2 to adapt the technique or modify it in any way to
3 make that determination on HPLC? That could have
4 been done in July of this year?

5 A. Right. And July of the
6 previous year as well.

7 Q. I take it then, Doctor, as part
8 of the research which you have undertaken and which
9 is continuing, you are now simply looking to that
10 technique as a procedure to assist you in identifying
11 the presence of digoxin, but no technical variation
12 on what existed in the Hospital as a HPLC technique
13 in July has happened? There has been no change in
the technique?

14 A. Well, we hadn't measured
15 digoxin in July, but the technique is basically
16 HPLC of which I have had a lot of experience.

17 Q. All right. And there was
18 nothing specifically that you had to do either with
19 the equipment available in the Hospital or the
20 methodology with which you were previously familiar
21 to accommodate that technique to run these tests to
identify the presence of digoxin?

22 A. No. I just had to I guess tap
23 my years of experience in HPLC.

24 Q. Yes, I understand.
25



L8 1
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3 Doctor, we have heard and I don't
4 intend to dwell at length on it but we have heard
5 a number of comments this morning concerning the
6 nature of discussion that took place at a meeting
7 at which you attended prior to giving your evidence
here.

8 Do you recall attending a meeting on
9 October 7th at which Mr. Roland, Counsel for the
Hospital was present and I was present?

10 A. Yes, I do.

11 Q. Doctor, you have heard me say
12 this morning that it was my understanding as a
13 result of those discussions that you did not then
14 feel yourself to be in a position to discuss the
15 results of the water loading experiment that you had
16 undertaken by virtue of the fact that the results
17 were preliminary and that you were not yet in a
18 position to speak with any confidence as to their
validity or their meaning.

19 That has now happened, Doctor, in the
20 sense that you have now given evidence with respect
21 to those experiments, and I would ask you since the
22 date of October 7th when that meeting took place and
23 yesterday, was there anything further that happened
24 in your research or any results that came to your
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attention from those experiments which led you to
give that evidence yesterday when you previously
felt it was premature to discuss the testing at all?

A. Well, there were certain
aspects on October 7th that were very hard
scientific data as far as I was concerned and there
were other areas that I was awaiting data and results,
and some results have obviously come in, so that I
am confident that we have developed procedures to
isolate a compound - you can call it substance X -
and not only developed procedures to purify that
compound but we have developed procedures to obtain
a lot of information as to what that compound actually
is.

Q. Doctor, my question to you
essentially is are you more confident today as to the
reliability of these experimental results than you
were 10 days ago?

A. Well, I have more knowledge
today than I had 10 days ago. That is all - you know,
the data that we had 10 days ago hasn't changed. We
have added to it.

Q. When you say you have added to
it and you have more knowledge I take it you have
run more assays?



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A. Yes, especially the mass spec.

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Q. Had you 10 days ago run any

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assays and obtained any results on your mass spec

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from your colleague at the Best Institute?

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A. We had data on digoxin and

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we had data on these metabolites but we didn't have

8

data on substance X.

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Q. I take it then sitting here

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today, Doctor, you are confident on the basis of

11

the experiments that you have conducted to date you

12

have successfully been able to identify substance X

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by the techniques that you have described in the

urine specimens of this sample population?

14

Are you prepared to --

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A. When you say "identify", if

16

you mean I can put a molecular structure to it I

will still hesitate to do that.

17

If you say identify - have we purified

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it, yes, we have purified it. We have a lot about

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its molecular weight, about its probable structure

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and we may even venture some suggestions as to its

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actual structure.

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Q. All of that I take it, Doctor,

was well underway and was the case 10 days ago?

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A. Except that we didn't have the

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mass spectra 10 days ago.

Q. All right.

A. Yes, the experiments leading to that had been underway for three months. But the mass spectra only became available about 9, 10 days ago.

Q. I see, Doctor. So that all of the assays that have been run by your colleagues at the Best Institute on mass spectrometry have been undertaken within the last 10 days? Do I have that correctly?

A. No. All the studies on substance X, yes.

Q. I'm sorry, Doctor. I thought that is what we were talking about.

A. He had measured digoxin, looked at the digoxin spectra, the digoxin metabolites, looked at their spectra.

Q. I see.

A. And this all occurred and when these compounds were run by us, the digoxin and metabolites were run by HPLC you have a separated - separated fractions were given to Dr. Kuksis who then ran mass spectra on them.

Q. I take it then --



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A. We then compared that with substance X but that was only obtained about 10 days ago.

Q. I take it then, Doctor, so that I am very clear that I understand, all of the tests that have been run regarding this substance X as distinct from digoxin and mass spectrometry have been undertaken and the results have come back from the last 10 days?

A. All of the mass spectra data, yes.

Q. All right. And it is on the basis of that additional knowledge and that additional information that you today can say with confidence that the technique and the experiments which you have undertaken permit you to identify with certainty substance X in any given urine specimen of your sample population? Is that --

A. It has certainly helped largely to build my confidence in our data, yes.

Q. Doctor, now other than those tests and those assays that were run in the Institute, has there been any additional or different tests undertaken in the last 10 days as part of these water loading experiments?



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A. Yes, there have been lots of tests.

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THE COMMISSIONER: I'm sorry, what was that?

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THE WITNESS: Additional tests that have been undertaken.

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MS. CRONK: Q. And are they simply more, Doctor, of the same assays from urine specimens that you previously conducted? More in number?

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A. I would rather not get into it if that is possible, but we have done a lot of additional studies.

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Perhaps I could add one thing that if you do water loading experiments of this type you can isolate by HPLC fractions that have digoxin activity as we know. We call that substance X perhaps Y and Z.

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You can also isolate fractions which have activity in other assays, immunoassays. Not digoxin immunoassays, and so we have done a lot of work on the other immunoassays as well.

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Q. Doctor, within the last 10 days have you undertaken any further tests as part of these experiments on blood specimens from the same adult sample population?



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A. No.

Q. So you have not?

A. No.

Q. So they had all been done as
of 10 days ago?

A. Yes.

Q. Within the last 10 days have
you undertaken any assay tests or experiments on any
urine specimens from any infants at all?

A. No.

Q. All right. Then within the
last 10 days have you undertaken any assays or tests
on plasma specimens from infants at all?

A. No. I am sure - we always
have been doing digoxin assays --

Q. As part of this water loading --

A. As part of the study, no.

Q. All right.

A. We have not subjected any
patient population to the water loading study.

Q. Doctor, may I turn then
briefly to another area?

You told Mr. Strathy to the best of
your recollection - this is in the context of the
death of Allana Miller and digoxin assays that had



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been run in respect to that child - that another
sample of the oral medication or elixir from Ward
4A/B had been tested you thought on Thursday?

A. Yes.

Q. Do you recall that?

A. Yes.

Q. You were talking about
Thursday, March 19th, or the following Thursday,
March 26th, 1981?

A. No, I thought it was the 19th.

MS. CRONK: Mr. Registrar, would you
show the Doctor, if you would, please, Exhibit 32B?

Q. Doctor, I would ask you to turn
if you would to Tab 45, page 27, please.

Do you have that, Doctor?

A. Yes.

Q. Doctor, at that page, on page,
the bottom half of page 26 and the beginning of page
27 we see the results of the various digoxin assays
that were carried out on March 19th.



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Q. Can you help me, doctor,
as I understood it, you thought the assays were
conducted on that sample of elixir on that day. Are
there any results set out there on March 19th that
pertain to that assay test?

A. Yes, there is, on the
18th of March. I'm sorry, it was the 18th of March.

Q. And, doctor, when you are
looking at the entries for the 18th of March, are
you referring to Items 12 through 14?

A. Right, to 15.

Q. I'm sorry, through to 15.

A. Right.

Q. And, doctor, as I read
the entries then, a sample of lanoxin or the oral
elixir was assayed at least four times on that day.

A. Yes.

Q. And you were aware of that,
doctor, I take it at the time, the weekend of March
21st when you were called in to supervise the assays
on Allana Miller and, subsequently, on Justin Cook?

A. Yes, I was.

Q. What was your understanding,
doctor, as to why tests were being undertaken two
days previously on a sample of oral elixir from this



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A. Well, I think I intimated that we had a meeting in Dr. Hill's office, and Dr. Hill indicated to me that there was some concern on 4A/B about digoxin. This is the first I had heard of any concerns personally as to problems on 4A/B and digoxin. He expressed, I think, if I recall rightly, that the concerns may be attributed to the pharmaceutical preparation. I, in discussion with him since, I went to Ward 4A/B and got a sample of digoxin from that ward and gave it to Dr. Ellis, apparently.

Q. For testing?

A. For testing, yes.

Q. And do you see here, doctor, beside those various entries of March 18, the results of four assays that were conducted on that sample?

A. Right.

Q. Was it one sample or more than one?

A. No, it was one bottle.

Q. Can you help us, doctor, as to what the significance, if any, is as to the results that are recorded?



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A. They are as they should
be, essentially.

Q. I take it, then, that on
the basis of that test, there was nothing to indicate
that the preparation of the elixir had contained a
high concentration of digoxin than had been indicated
by the manufacturer?

A. Right.

Q. And we know, doctor, that
when it came to the tests which were done on the 21st
of March, you repeated a like test on another
sample of oral elixir from the ward and obtained a
like result.

A. Correct.

MS. CRONK: Mr. Commissioner, I
will only be a few more minutes. I think I can
finish by quarter after one.

THE COMMISSIONER: What do you have
planned for us for this afternoon?

MS. CRONK: The next witness is
Mr. Cimbura, sir, and he is not available until
tomorrow morning, so we are looking at a short
afternoon.

THE COMMISSIONER: I think, put
to a vote, that everyone would be in favour of your



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2 completing in fifteen minutes.

3 MS. CRONK: I would have thought so.

4 THE COMMISSIONER: If that is
5 possible. Perhaps Dr. Soldin could lead the
6 cheering section!

7 MR. ROLAND: I think Dr. Soldin
8 is anxious to get back to his experiments!

9 MS. CRONK: I can understand that.

10 Q. Doctor, other than the
11 tests of the oral elixir that were conducted on
12 March 18th and the assays that were conducted on the
13 21st of March, are you aware of any other assays
14 for digoxin conducted in respect of the preparations
15 of digoxin available on that ward during this week,
16 other than those two?

17 A. No, I am not aware of any
18 others.

19 Q. To the best of your
20 knowledge, then, doctor, I take it no assays were
21 conducted in respect of digoxin ampoules that were
22 available on the ward?

23 A. That is correct.

24 Q. Doctor, you will recall
25 as well this morning, I believe it was Mr. Hunt,
during the discussion with him, he drew your attention



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to the previous evidence of Dr. Costigan --

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A. Yes.

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Q. -- regarding the time at

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which Dr. Costigan, as he recalls it, was informed

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of the death of Allana Miller and his activities

7

early that Saturday morning.

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A. Yes.

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Q. As I understand your

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evidence, to the best of your recollection, it was

12

your belief at the time that you testified yesterday

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that you were alerted to the death or the arrest of

14

that child by Dr. Costigan by virtue of the tele-

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phone call at two or three in the morning, during

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the early hours of March 21st?

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A. Yes.

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Q. Is that correct?

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A. Yes.

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Q. And in that regard, we

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have heard that your recollection and Dr. Costigan's

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differ?

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A. Right.

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Q. You told me yesterday,

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however, that, in respect of the telephone discussion

that you had, you thought with Dr. Costigan, the

decision was made at that time to run digoxin assays



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in respect of a sample of the oral medication from the ward. You also told me that you then, after having received the telephone call from, you thought, Dr. Costigan, called Candy Cheong and instructed her as to how to run the assays?

A. Right.

Q. Do you recall that?

A. Yes.

Q. As I understood your evidence, doctor, you instructed her to run the assays at various dilutions and, as well, to run an assay on the second sample of oral elixir from the ward?

A. Yes.

Q. Do I have that correctly?

A. Correct.

Q. Do I take it then, doctor, that whichever doctor it was that you spoke to at two or three in the morning, the matter of running the assays on the Allana Miller sample at a number of dilutions was a matter specifically discussed then between you?

A. Well, it was discussed between me and the doctor but, whether it was discussed at three in the morning or whether it was



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2 discussed in another conversation later in the
3 morning, I can't tell you. Certainly, we got
4 samples for analysis prior to Candy Cheong doing
5 the entire run.

6 Q. And do I take it correctly,
7 doctor, do I have it correctly, that the purpose
8 of running the assay at various dilutions, or at
9 least the fact of doing that, was motivated by the
10 concern that there might be a high level, there
11 might be a problem with this level?

12 A. Right.

13 Q. Was that related, doctor,
14 to your discussion the previous week, which you
15 have now told us about, in which it was indicated
16 to you there might be a problem with digoxin on
17 Wards 4A/4B?

18 A. Yes, I'm sure it was.

19 Q. And similarly, with
20 respect to the assay which you instructed Miss
21 Cheong to perform on the sample of oral elixir from
22 the ward, did you have in mind, when you ordered
23 that, the fact there had been a test done earlier
24 in the week on another sample of elixir?

25 A. I knew there had been, yes.

Q. And why, in those



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2 circumstances, doctor, were you ordering another
3 assay to be done on another sample from the ward of
4 elixir?

5 A. Well, in the event that
6 the drug had been administered from this particular
7 bottle and I wanted to know what the concentration
8 of digoxin was in the bottle.

9 Q. Dealing as well generally
10 with the issue of readings that you have done of
11 concentrations of digoxin that you have seen since
12 the end of March 1981. As I understood your evidence
13 with Mr. Strathy early this morning, you indicated
14 that you thought, since July of 1981, when you
15 became involved in conducting the various digoxin
16 assays in the Hospital, that you had seen, you
17 thought, about three cases where the levels were
18 greater than 50 nanograms; do I have that
19 correctly?

20 A. Possibly, three.

21 Q. Possibly, three. You
22 were approximating three?

23 THE COMMISSIONER: Greater than
24 what?

25 MS. CRONK: Greater than 50 nano-
grams.



Soldin
re.dr. (Cronk)

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A. In other words, gross contamination.

Q. Doctor, that is the issue I would like to explore with you. As I understood it, you suggested that levels of that kind could have occurred because of contamination by one of two possible methods. The first was that a syringe was used to administer digoxin and then the same syringe was used to draw a blood specimen which was then assayed for digoxin.

A. Right.

Q. Amongst other things?

A. Yes.

Q. Was that, in fact, doctor, to the best of your recollection, the explanation that applied to those particular readings that were greater than 50?

A. No. I think the explanation was the second one, which was that digoxin had been administered via an IV line and that a sample was then drawn for digoxin assay out of the same line shortly thereafter.

Q. And in the cases in which you recall a level of greater than 50, they were explained by virtue of that circumstance?



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M10 2 A. Yes. There was no
3 clinical symptomatology associated with that level.

4 Q. As I understood it, you
5 told Mr. Hunt this morning, leaving aside those
6 cases of the kind of contamination that you have
7 discussed where the levels were greater than 50,
8 the highest level, or the highest reading on digoxin
9 that you have seen since July of 1981 is under 20
nanograms; do I have that correctly?

10 A. Except for Murphy,
11 possibly, yes. No, Murphy was around 25.

12 Q. Is it the Gary Murphy
13 case that you are recalling when you say you had
14 seen a level under 20, doctor? Is that the one
15 that comes to mind when you think of high levels
since July of 1981?

16 A. Yes.

17 Q. With the exception of
18 Gary Murphy, have you, since becoming involved with
19 the digoxin assays at the Hospital, seen any other
20 levels between 15 and 20 nanograms, other than Gary
Murphy?

21 A. I think we had possibly
22 one, at around 15, a few months back, three or four
23 months back.

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Q. Was that matter investigated
and enquiries made?

A. Yes, it was. Yes.

Q. What was the explanation
for that level, if any?

A. That the patient had
taken an overdose of digoxin. Actually, it was a
young kid who had swallowed a lot of tablets.

Q. Not an infant in the
Hospital?

A. No, not an infant.

Q. Someone who was admitted
for the reason of an overdose?

A. Yes, and now is well. Yes.

Q. Doctor, as I understand
it, again, this was a matter discussed in part earlier
this morning, that one of the possibilities that
you are currently examining as part of your ongoing
research is whether there may be clinical conditions
or events which occur during resuscitation
efforts that may trigger the release of substantial
or significant quantities of Substance X; do I have
that correctly?

A. Yes.

Q. And in your discussion



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M12

yesterday with the Commissioner and the request that you made for receipt of various tissue samples, do you recall that, for testing purposes, I take it you had in mind at the time you were talking about that request the research that you have been conducting to date concerning the possible effect of resuscitative efforts as well?

A. Right.

Q. Doctor, as was reviewed this morning, since March of 1981, we have heard in evidence that the Hospital has done digoxin assays on post mortem blood samples on virtually all children, as you described it, who died since March 1981 on Wards 4A/4B?

A. Yes.

Q. Is that correct?

A. Yes, you have that correct.

Q. And you told Mr. Hunt, I'm sorry, Mr. Young, this morning that many of those children were children who would have been on digoxin?

A. Yes.

Q. You told Mr. Young as well that many of those children are children who



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would have been the victims of unsuccessful
resuscitation efforts; do I have that correctly?

A. I don't know how many.
Some would have been.

Q. Some would have been?

A. Yes.

Q. I suggest to you as well
that there is a great likelihood that some of those
children might as well have been in renal failure,
do you agree with that, at the time of their deaths,
in all of those deaths since March 1981?

A. Some may have, yes.

Q. And, as well, some of
those children would not have been on digoxin
therapy at the time of their deaths; there is a
likelihood that is true?

A. Yes.

Q. I suggest to you as well
that some of those children may well have
experienced defibrillation as part of the resuscitation
efforts that were undertaken?

A. Right.

Q. Do I have that correctly?

A. Yes.

Q. As you told Mr. Young, and



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as I discussed a few moments ago, leaving aside the three cases where contamination of samples resulted in levels of greater than 50 nanograms, the highest digoxin reading of which you are aware since July of 1981 is in the case of Gary Murphy?

A. Yes.

Q. Doctor, I suggest to you that, since the end of March 1981, no child has died on Wards 4A/4B exhibiting quite the same and precise measure of clinical conditions, renal dysfunction and resuscitative insult to generate levels as high as those which you recorded on March 21, 1981 in respect of Allana Miller and as high as the ones that you recorded in respect of Justin Cook on March 22nd? That is the situation, is it not, doctor?

A. Yes.

Q. And that is true even though the technique available in the Hospital for the testing of digoxin and for the running of digoxin assays since that time has been an RIA methodology, which, in your view, is not sufficient to segregate out substance X; is that correct?

A. Right.

Q. Doctor, with respect to



M15

1 the question of the provision of tissue samples, I
2 would just like to be clear about one other matter.
3

4 If it should be the case that
5 there are specimens that still exist today and may
6 then, therefore, be available for further testing
7 for digoxin, would you be concerned, as a biochemist
8 who might be involved in the conduct of those
9 assays, as to their stability, given that those
10 specimens would be at least two and-one-half years
11 old? Would that present any concern to you?

12 A. That would present a
13 concern. It depends on how they have been stored.
14 That would be quite a crucial issue.

15 Q. Doctor, do you, in fact,
16 know how the specimens that were once at the
17 Hospital and which left the Hospital during that
18 first week after these deaths, the end of March
19 1981, have been stored since that time?

20 A. No, I don't know.

21 Q. Do you have any parti-
22 culars on that at all?

23 A. No.

24 Q. Can you help me then,
25 doctor, with what you meant when you suggested there
had been a lack of care taken in the storage of those



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samples?

A. No, I didn't suggest that.

Q. I thought, this morning,
you said --

MR. ROLAND: That wasn't a sug-
gestion. This is the first we have heard that.

THE COMMISSIONER: I thought there
was something he indicated that someone, somehow,
had not looked after the samples, except they are
in storage.

THE WITNESS: My inference, if
you will allow me to repeat it, is that I have --
well, prior to this, my evidence today, I have
been somewhat critical of the analytical procedures
employed, and all I did was --

MS. CRONK: Q. Is that what you
were referring to, doctor?

A. Right.

Q. And you were not referring
to the fact that there may have been some deficiency,
as you understood it, in the way any of these
specimens may have been stored?

A. I didn't know how they
had been stored.

Q. I wouldn't have thought so,



M17

1
2 doctor.

3 Finally, doctor, as I understood
4 your evidence this morning, you indicated that you
5 were involved in the conduct and performance of
6 digoxin assays with respect to Gary Murphy; do I
7 have that correct?

8 A. Yes.

9 MS. CRONK: Mr. Registrar, could
10 you serve the doctor, if you would, please, Exhibit
11 172.



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Q. Doctor, would you turn to page 141 if you would. This exhibit is a copy of a part of the medical record of Gary Murphy, that part which applies to the time period immediately before and at the time of his death.

A. Yes.

Q. Do you have page 141, Doctor?

A. Right.

Q. Right. Doctor, we have heard in evidence previously that the last antemortem digoxin level which was taken in respect of Gary Murphy was taken on April 4, 1983?

A. Yes.

Q. And that no levels were taken thereafter until the date of his death on April 23rd. We see on page 141 Sample No. 212099.

A. Yes.

Q. Which appears to have been taken at 4:30 a.m. on April 24th.

A. Yes.

Q. The child died on April 23rd at 6:37 p.m. in the evening. May I ask you, Doctor, did you personally conduct or supervise the digoxin assays that were conducted in respect of that sample?

A. I supervised them, yes.



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Q. All right. I appreciate, Doctor, that you do not have any digoxin book materials available to you in this form with respect to assays conducted in April of this year, but can you help us now as to the number of dilutions that were involved with respect to this sample which ultimately yielded a level of 18.7 nanograms. Do you have that information with you today, Doctor?

A. Yes, I am just reviewing it. It was done times 5, times 10, times 20.

Q. It was done neat?

A. It was done straight times 5 times 10 times 20.

Q. And was the result when it was done neat greater than 5?

A. Yes, it was.

Q. And the results when it was done times 5 dilution was what?

A. Was 21.

Q. And the result when it was done times 10?

A. It was 24.

Q. And times 20?

A. 24.

Q. And those of course we know



1

2

are measurements in nanomoles per litre?

3

A. Yes.

4

5

Q. And when the 24 nanomoles level is converted, that results in 18.7 nanograms, as indicated on page 141?

6

A. Yes.

3

7

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Q. All right. Doctor, there is an indication on this form of therapeutic drug monitoring cumulative report that the specimen involved was a plasma specimen. Does the information available to you there indicate the circumstances under which that sample was taken?

13

14

15

A. Well, not in this sheet here but in my notes here I do have - yes, this was a sagittal sinus sample. 212099 was a sagittal sinus sample.

16

17

18

19

20

Q. And do you know, the sample was obviously taken many hours after the child's death because Gary Murphy died at approximately 6:37 p.m. on the evening of April the 23rd. Was this sample taken during the course of an autopsy, do you know?

21

22

23

24

25

A. It must have been, yes.

Q. Well, do you know whether it was?



1

2

A. It must have been.

3

Q. Because if not we can find that
out from others, Doctor?

4

A. It must have.

5

4

6

Q. All right. I question that
Doctor, only because the sample time appears to be
4:30 in the morning.

7

8

A. Yes.

9

10

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Q. That would suggest to me
that it may not have been taken at autopsy. Doctor,
would you turn as well if you would please to page
147 of the Murphy chart. We see there as well,
Doctor, a number of other samples with the digoxin
level results being reported. I would refer you first
to the sample referred to in the first column,
Sample No. 212425 which appears to have been taken
at 11:00 p.m. on April 23rd. Do you see that,
Doctor?

18

A. Yes.

19

Q. All right. That appears to
be a plasma sample?

20

21

A. Yes.

22

23

24

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Q. All right. Doctor, once again,
did you either conduct or supervise the performance
of the assays conducted on this sample?



Soldin, re.dr.
(Cronk)

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A. I did, yes.

3

Q. All right. Can you help me

4

as to what the dilutions were to arrive at that
result? Was the sample done neat?

5

A. Yes, it was done the same

6

dilutions neat times 5 times 10 times 20.

7

Q. All right. And what was the

8

results when it was done neat, was it simply off the
maximum?

9

A. Yes, it was.

10

Q. And when it was done at a

11

dilution of 5?

12

A. It was 24.5.

13

Q. 24.5?

14

A. Yes.

15

Q. And when it was done times

16

10?

17

A. 24.

18

Q. And when it was done - was

19

it then done times 15 or times 20?

20

A. Times 20.

21

Q. And what was the result

times 20?

22

A. 22.

23

Q. 22?

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A. Right.

Q. All right. I take it then, Doctor, that when a result of 24 nanomoles is reported, that was the number selected as the result of a dilution of times 10 and that was reported?

A. Right.

Q. And that reading is identical when converted to the reading of 18.7 nanograms?

A. Yes.

Q. Doctor, there is a footnote which appears below the level of this sample which indicates that the specimen was that of heart blood. Do you see that?

A. Right.

Q. Does that accord with your understanding?

A. It does, yes.

Q. Doctor, do you have any information or knowledge as to the circumstances under which that sample was taken?

A. Yes, I do.

Q. All right. To the best of your knowledge, when was the sample taken. It is 11 o'clock at night, and the child died at 6:37 p.m. earlier that evening. Do you know whether or not an



1

2

autopsy was commenced that evening?

3

4

A. I think the sample was taken -
it might have occurred - my understanding is that
that sample was not taken at autopsy.

5

6

Q. All right. Do you know who
took the sample, Doctor?

7

8

A. I think it was a heart puncture.

9

Q. I am sorry, I didn't hear you,
a heart puncture?

10

11

A. Right. Well, it was Dr.
Cloutier who brought the sample to Joan Hayes who
performed the analysis.

12

13

Q. Is Miss Hayes in your lab?

14

A. Yes.

15

16

Q. Were the assays conducted on
these two samples that we have just looked at,
Doctor, conducted on the FPIA method or the RIA method?

17

18

A. They were conducted on the
FPIA method -- sorry, sorry, sorry. These are all
on the RIA method.

19

20

21

22

Q. Were they as well tested on
the FPIA method which we know was introduced on
an experimental basis in the hospital in April of
this year?

23

24

25

A. Yes, they were.



1
2 Q. All right. Doctor, let's
3 deal with the one that we have just looked at, Sample
4 No. 212425. What was the result when that sample
5 was assayed on the FPIA method?

6 A. 24.6.

7 Q. Measured in nanomoles?

8 A. In nanograms per litre. I
9 have converted it. It was 31.5 nanomoles.

10 Q. I am sorry, Doctor, what was
11 it in nanomoles?

12 A. 31.5.

13 Q. And it was 24.6 nanograms?

14 A. Nanograms per litre, yes.

15 Q. So, it was a higher reading
16 then that had resulted on the RIA for the same
17 sample?

18 A. Correct, yes.

19 Q. All right. And how many times
20 was the sample diluted for the FPIA method?

21 THE COMMISSIONER: We will be looking
22 at what page?

23 THE WITNESS: It was diluted five fold.

24 MS. CRONK: Q. Mr. Commissioner, we
25 are at page 147.

THE COMMISSIONER: Oh, yes, all right.



1
2 MS. CRONK: I am still looking at
3 the first sample.

4 Q. Was it run then first neat,
5 Doctor?

6 A. That particular sample I don't
7 see a recording of it being run neat, no.

8 Q. What was the first dilution
9 at which it was run?

10 A. It was times 5.

11 Q. And what was the result?

12 A. 24.6 nanograms per millilitre.

13 Q. And was it then diluted times
14 10?

15 A. No, it was run once by FPI -
16 it was run four times by RIA.

17 Q. Oh, I see, Doctor, I am sorry.
18 So, it was run once on FPIA and the result was 24.6
19 nanograms?

20 A. Right.

21 Q. May we turn then back, Doctor,
22 if we would just for a moment to page 141, the sample
23 that we looked at a moment ago.

24 A. Yes.

25 Q. We know that the result on
the assay reflected on this page was 24 nanomoles or



Soldin, re.dr.
(Cronk)

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18.7 nanograms and you have told me the various
dilutions that were undertaken?

3

4

A. Yes.

5

6

Q. I take it that that result
and all of those dilutions pertain to the running
of an assay on the RIA technique on that specimen?

7

8

A. That is correct, yes.

9

10

Q. Was this specimen also tested
on the FPIA technique?

11

A. Yes, it was, both of those
were.

12

Q. All right. And was the sample
run neat on the FPIA?

13

14

A. It was run with a tenfold
dilution.

15

16

Q. I am sorry, Doctor, just so
I am clear. It is Sample No. 212099?

17

A. Yes.

18

Q. All right. Was it run neat
first?

19

20

A. It was run neat first and
then times 10.

21

22

Q. All right. What was the
result when it was run neat?

23

24

25

A. It was above the highest



1
2 standard, so, that was 6.4.

3 Q. The highest standard was 6.4
4 nanomoles?

5 A. Yes, nanomoles.

6 Q. Does that convert to 5 nanograms?

7 A. Right.

8 Q. All right. And what was the
9 result times a dilution of 10?

10 A. 29.3.

11 Q. 29.3. nanomoles or nanograms?

12 A. Nanograms per millilitre.

13 Q. What was it in nanomoles,
14 Doctor?

15 A. 37.5.

16 Q. I take it then, Doctor, in
17 respect of both of those samples, the results on the
18 FPIA resulted in higher readings?

19 A. That's correct.

20 Q. Than did the RIA?

21 A. Yes.

22 Q. All right. Were the results
23 obtained on the FPIA testing mechanism reported as
24 well, do you know?

25 A. No, just the RIA method.

Q. Was there any reason for that,



1

2

Doctor?

3

4

A. Well, at that point in time
we were not reporting the FPIA results.

5

6

Q. Did that have some relation-
ship to the fact that it was a newly introduced
mechanism to the Hospital?

7

8

A. It wasn't yet officially
introduced into the Hospital.

9

10

Q. This is the end of April,
1983?

11

A. That's right.

12

13

Q. When was it officially
introduced. I thought it had been that month?

14

A. No, about then, but it wasn't
introduced on the night of the Murphy death.

15

16

Q. Finally, Doctor, back to
page 147 if you would, please.

17

A. Yes.

18

Q. Do you have that?

19

A. Yes.

20

21

Q. The last sample, Doctor, which
we haven't looked at is the one reported in the
third column over. It is Sample No. 212098.

22

A. Yes.

23

Q. Taken at 1845 hours on April

24

25



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1

2

24th?

3

A. Yes.

4

Q. Do you see that, Doctor?

5

A. Yes.

6

Q. The level reported there is greater than 6.4. I take that to be in nanomoles?

7

A. Nanomoles, yes.

8

Q. All right. And if we look

9

to footnote C which is highlighted Doctor, we see that that is a specimen of heart blood?

10

A. Right.

11

Q. All right. And we see as

12

well a reference to a footnote labelled C-2 analysis performed on TDX instruments. Does that mean that this sample was assayed on the FPIA methodology?

13

14

15

A. Yes.

16

Q. All right. Was it as well

17

assayed on the RIA methodology?

18

A. No, it wasn't.

19

Q. Was there any reason for

that?

20

A. A volume problem, there wasn't enough sample.

21

22

Q. To do it on the RIA?

23

A. Both ways, yes.

24

25



1
2 Q. All right. So that when we
3 seen then the reading of greater than 6.4, was that
4 the result of a neat assay of this specimen on FPIA?

5 A. Yes, it was.

14
6 Q. All right. And if we turn
7 over, Doctor, to the very next page it appears to be
8 the same sample number and the result this time shows
9 a reading of 25 nanomoles?

10 A. Yes, that's right.

11 Q. Was that the end reading on
12 the FPIA assays conducted on this specimen. Was that
13 the final reading, Doctor?

14 A. No, my recollection is that
15 we only did it once on the FPIA.

16 Q. The report at page 148 appears
17 to apply to the same specimen number taken on April
18 24th, 1983 but you will note that the timing of this
19 specimen is different?

20 A. Yes. There was a problem.
21 What occurred was that a second sample was brought
22 down by Dr. Cloutier to Joan Hayes. So, on the
23 first sample she only did an FPIA sample which she
24 got a result of 6.4 for.

25 Q. Of greater than 6.4?

A. Greater than 6.4.



1

2

Q. Greater than 5?

3

A. Right.

4

Q. All right.

5

A. And the second sample then,

that second sample was given ---

15

6

Q. Was that then re-assayed on the

7

RIA method?

8

A. It was re-assayed. It should

9

have been given a different sample number but it
wasn't.

10

11

Q. All right. Was that final

12

specimen, then, Doctor, as well a specimen of
heart blood?

13

A. Yes, it was.

14

Q. Was it run solely on the

15

RIA or was it run on both techniques?

16

A. It was run I think solely on

17

the RIA.

18

Q. All right. Can you tell me

19

then, Doctor. I assume it was first run neat on the
RIA?

20

A. Yes. 098, it was run neat

21

on 5 times 10 times 20.

22

Q. All right. And what was the

23

result when it was run neat?

24

25



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A. It was high, greater than 5.

3

Q. All right. And what was it

4

when it was run at a dilution of 5?

5

A. 24.5, and 24 at times 10 and

6

22 at times 20.

7

THE COMMISSIONER: I'm getting a little
alarmed, Miss Cronk.

8

MS. CRONK: I'm almost finished, Mr.

9

Commissioner.

10

THE COMMISSIONER: Fine.

11

MS. CRONK: Q. With your indulgence,

12

sir, I will be one moment.

13

THE COMMISSIONER: All right.

14

MS. CRONK: Q. Doctor, are you saying

15

that the results on this specimen were identical on
dilution to the results on Specimen No. 212425 which
we spoke about a few moments ago, which was a sample
also of heart blood but taken at a different time.

17

The results that you have just read to me are

18

identical, the results that you gave me for Sample
No. ---

19

20

A. That's right. 212098 was

21

converted in the next reporting and I think you've got

22

a report that is incorrect here. But the next report

23

had that correction made to it. So, you see, there

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were two samples, as you yourself pointed out, that
are of the same sample number; one that was drawn at
6:45 and one that was drawn at 9.

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Q But you are saying, Doctor, that
the results of the assays --

A This is the same sample.

Q I am sorry, Doctor, it is the
same as which sample?

On page 147 of the medical record there
are three different samples set out. Do you see that,
Doctor?

A Yes.

Q The third one, Sample No. 212098
you have told me was one specimen, and that there is
another specimen which accidentally bore the same
specimen number so that there were four in total. And
you have just given me the same results?

A That is my recollection, yes.

Q On 212098, the heart blood
specimen as you did for the Heart Blood Specimen
No. 212425, and my question was merely to confirm that
the results were in fact identical?

A I don't have the book here with
me so that I might be - it might be easier if I just ...

Q Perhaps, Doctor, you can let us
know subsequently through your counsel if there is
any differential on the last specimen numbers that we
have just looked at.



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But in any event I take it that the final result of 24 was expressed in nanomoles, and it similarly converts to 18.7 nanograms?

5

A. Yes.

6

MS. CRONK: Thank you, Doctor. I have no further questions.

7

Thank you, sir.

8

9

THE COMMISSIONER: You have no witness available for this afternoon?

10

MS. CRONK: No, sir, there is not.

11

Mr. Cimbura will be here at ten tomorrow morning.

12

THE COMMISSIONER: Thank you, Doctor.

13

Then we will adjourn until tomorrow morning.

14

15

--- Whereupon the Hearing adjourned at 1:25 p.m. until Wednesday, October 19th, 1983, at 10:00 a.m.

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